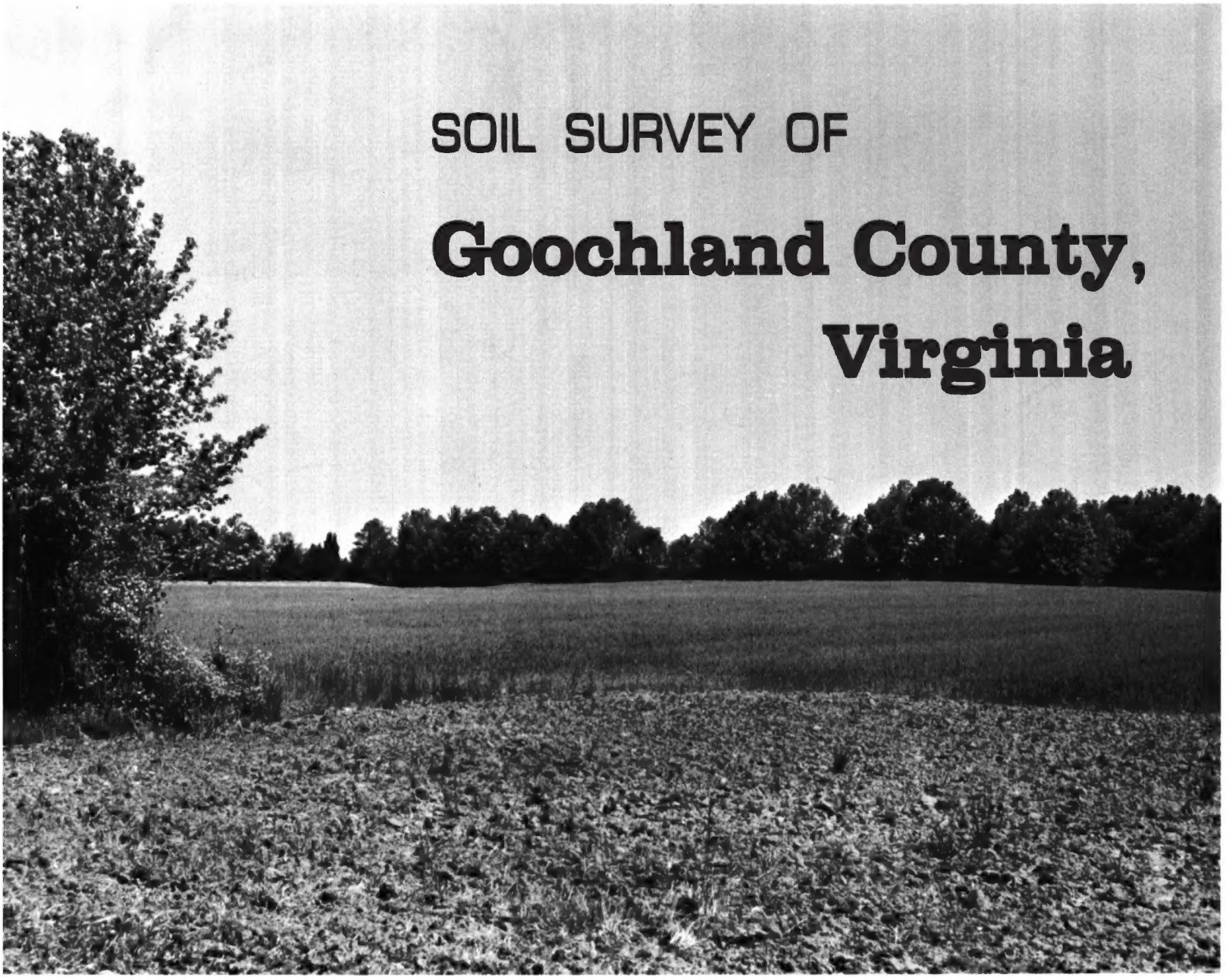


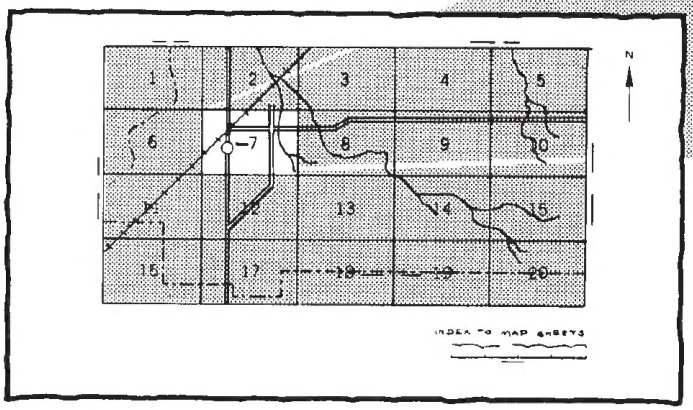
SOIL SURVEY OF

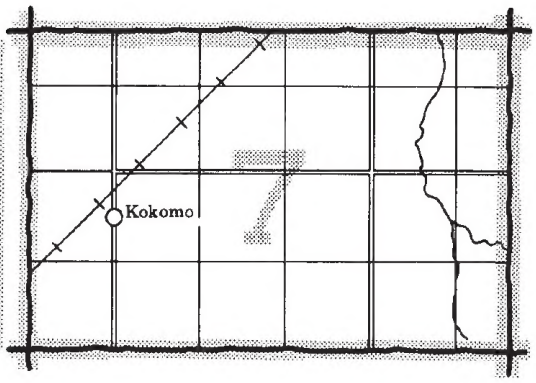
Goochland County, Virginia

United States Department of Agriculture
Soil Conservation Service
in cooperation with
Virginia Polytechnic Institute and State University

HOW TO USE

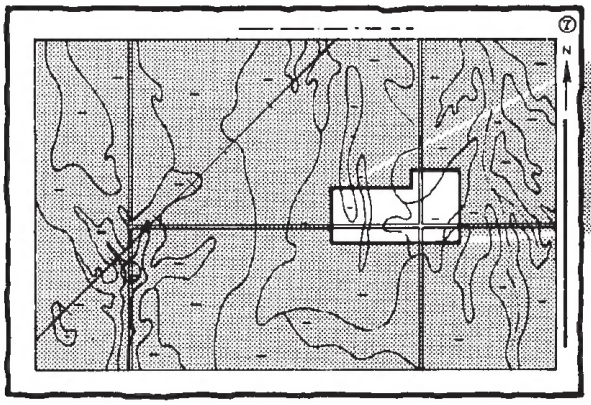
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

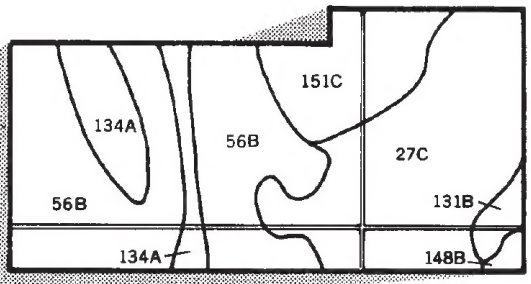




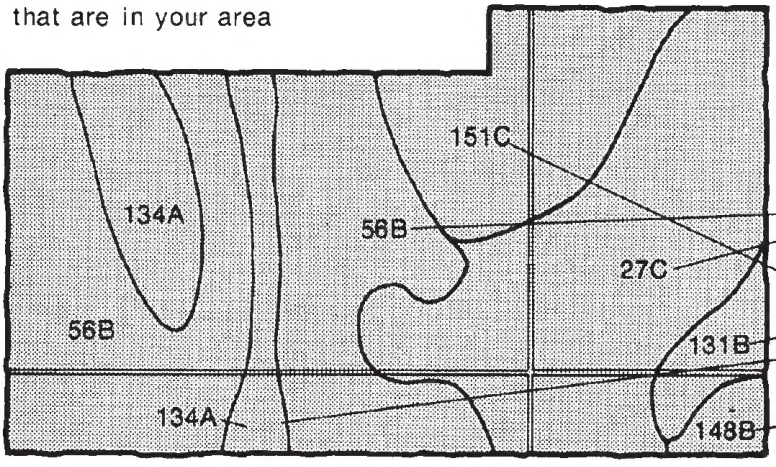
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.





4. List the map unit symbols that are in your area

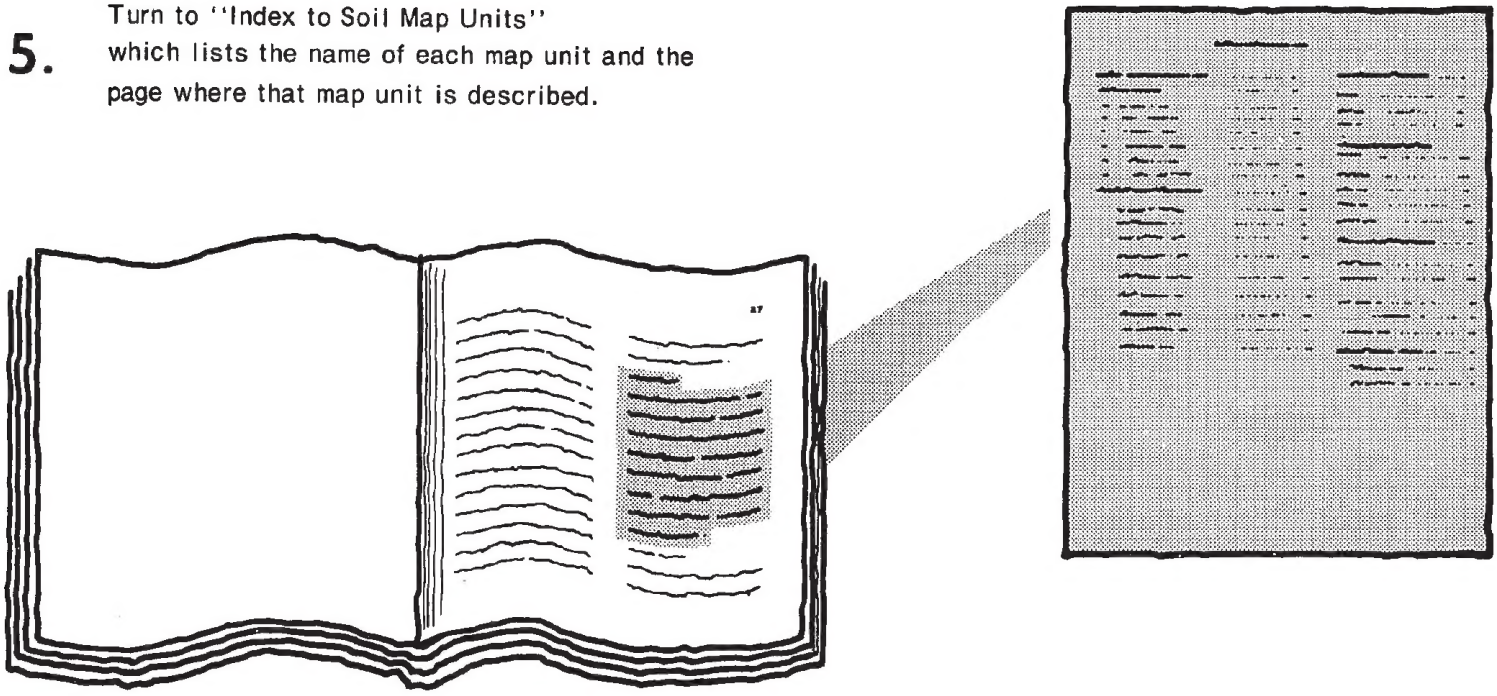


Symbols

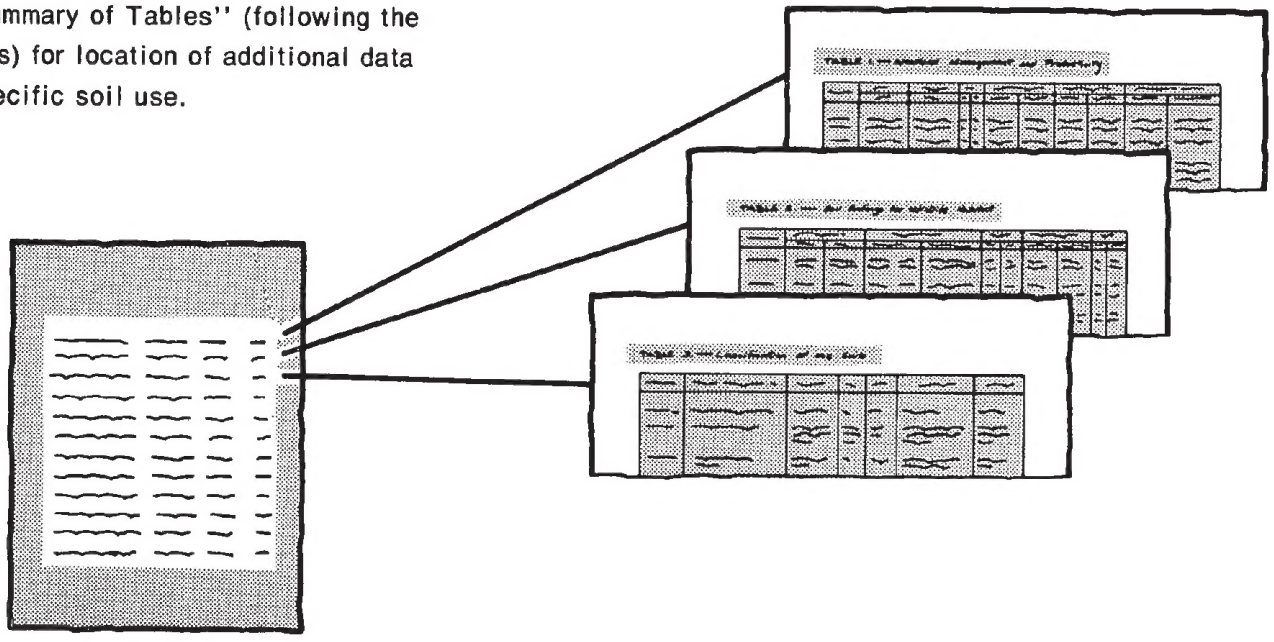
27C
56B
131B
134A
148B
151C

THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1968-75. Soil names and descriptions were approved in 1976. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1977. This survey was made cooperatively by the Soil Conservation Service and the Virginia Polytechnic Institute and State University. Additional assistance was provided by the Goochland County Board of Supervisors. The survey is part of the technical assistance furnished to the Monacan Soil and Water Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: In the foreground is an area of Sedgefield fine sandy loam, 2 to 7 percent slopes. An area of Fluvanna fine sandy loam, 2 to 7 percent slopes, eroded, in the background was seeded and has a stand of small grain.

Contents

Issued February 1980

Index to map units

Summary of tables

Summary of tables—Continued

Foreword

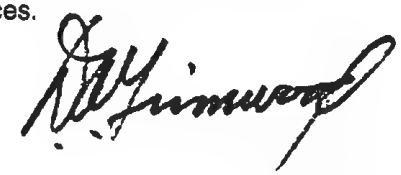
The Soil Survey of Goochland County, Virginia, contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

This soil survey has been prepared for many different users. Farmers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

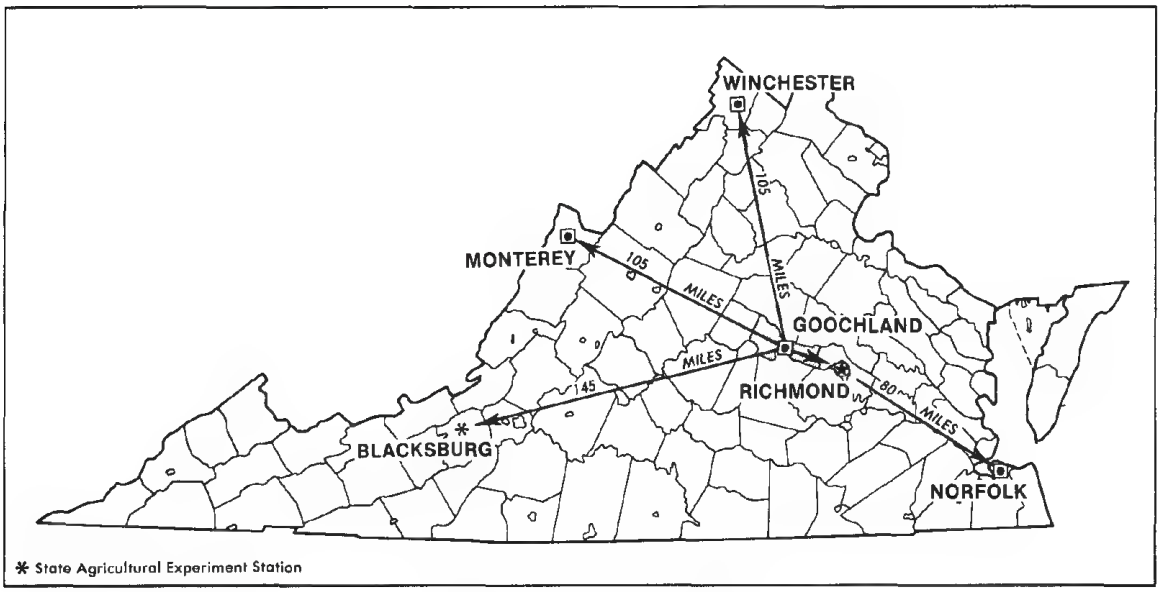
Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.



D. N. Grimwood
State Conservationist
Soil Conservation Service



Location of Goochland County in Virginia

Soil Survey of Goochland County, Virginia

By John C. Nicholson, Thomas R. Burruss, and
David L. Jones, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
in cooperation with the Virginia Polytechnic Institute and State University

GOOCHLAND COUNTY is in east-central Virginia. The county's area is 188,800 acres, or 295 square miles. The county is entirely within the Piedmont physiographic province.

Farming is the dominant enterprise in the county, although urban expansion from the city of Richmond is replacing agriculturally related activities in the eastern section of the county with housing, recreational facilities, and small industry. Most farms produce beef cattle, corn, and soybeans. A few produce poultry and dairy cattle. The county is about 65 percent woodland.

Goochland County was named for Sir William Gooch, Lieutenant Governor of the Virginia Colony from 1727 to 1749. The county was formed from Henrico Shire by an act of the General Assembly dated March 6, 1727, and effective May 1 of that year. At the time of formation, Goochland County covered the area from Tuckahoe Creek west to beyond the Blue Ridge Mountains.

The main automotive routes in Goochland County are U.S. Route 250 and Interstate Route 64, which runs east-west along the northern boundary of the county. Other major highways in the county include State Highway 6 and U.S. Route 522.

Quarry and sawmill operations are the major nonfarm industries in the county. Most of the commercial quarries are in the eastern part.

Goochland County receives some of its water supply from the James River and five major tributaries of the river, but wells supply most drinking water throughout the county. Most of the wells are less than 400 feet deep, and the average depth is about 175 feet.

General nature of the county

This section provides information on the climate of the county and describes the physiography, relief, and drainage of the area.

Climate

Goochland County is hot in summer and rather cold in winter. Precipitation is well distributed throughout the year and is normally adequate for all crops. Winter precipitation frequently occurs as snow, but the ground does not usually stay covered for more than a few days at a time.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Ashland, Virginia, for the period 1951 to 1974. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 37 degrees F, and the average daily minimum temperature is 26 degrees. The lowest temperature on record, which occurred at Ashland on January 18, 1957, is -7 degrees. In summer the average temperature is 73 degrees, and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred on September 8, 1954, is 105 degrees.

Growing degree days, shown in table 1, are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 22 inches, or 52 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest 1-day rainfall during the period of record was 5.24 inches at Ashland on August 27, 1971. Thunderstorms occur on about 37 days each year, and most occur in summer.

Average seasonal snowfall is 5 inches. The greatest snow depth at any one time during the period of record was 16 inches. On the average, 2 days have at least 1

inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 50 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The percentage of possible sunshine is 65 in summer and 50 in winter. The prevailing wind is from the west. Average windspeed is highest, 9 miles per hour, in March.

Climatic data in this section were specially prepared for the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina.

Physiography, relief, and drainage

Goochland County is wholly within the Piedmont physiographic province. In Virginia, this province lies between the Blue Ridge province on the west and the Coastal Plain province on the east.

The surface features of the county are those typical of a moderately high plateau dissected by numerous streams. Areas between the streams are moderately wide, and their relief is gently rolling to rolling. Land surfaces are of three general types: (1) gently rolling to rolling, moderately wide, weakly dissected divides of the upland; (2) narrow to moderately wide flood plains along the larger streams; and (3) hilly to steep areas along the major streams where the streams have cut deeply into the upland plateau. Entrenchment has been rapid along the James River and its major tributaries, and steep slopes commonly rise abruptly from the flood plains.

The highest point in the county, about 525 feet above sea level, is in the northwestern section. The elevation of the uplands ranges from about 160 to 525 feet. The lowest point in the county is about 120 feet above sea level in the southeastern corner. Flood plains along the James River range from about 120 feet to 200 feet. The land slopes generally toward the southeast.

Goochland County is drained by the James River and its tributaries. The James River flows toward the southeast, and its tributaries flow toward the south and southeast. The river forms the southern boundary of the county. The western section of the county is drained by Byrd Creek, and the eastern section by Tuckahoe Creek. The rest of the county is drained by Beaverdam Creek, Courthouse Creek, and Lickinghole Creek, all of which empty into the James River.

Except for some upland flats, some smaller, narrower flood plains, and some areas on the larger flood plains near the uplands, the surface drainage in the county generally is good. The drainage pattern is dendritic and irregularly branched.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the section "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

The general soil map at the back of this publication shows, in color, associations that have a distinct pattern of soils and of relief and drainage. Each association is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in other associations but in a different pattern.

The general soil map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

Soil associations

1. Creedmoor-Mayodan-Pinkston association

Deep and moderately deep, well drained and moderately well drained, gently sloping to steep soils that have a subsoil dominantly of clay or loam; on uplands

This association makes up about 5 percent of the county. The soils are mainly gently sloping and sloping.

Creedmoor soils make up about 55 percent of the association. They are moderately well drained, gently sloping or sloping soils in which the subsoil is clayey. The soils are on broad ridges and side slopes. Mayodan soils make up about 18 percent of the association and occupy the highest parts of the landscape. They are well drained, and they have a clayey subsoil. Pinkston soils make up about 9 percent of the associaton. They occupy narrow ridges and side slopes. They are well drained, gently sloping to steep soils that have a thin, loamy subsoil.

Colfax and Bourne soils make up most of the remaining 18 percent of this association. They are on stream divides and saddles. Both these soils are seasonally wet.

This association is limited for farming by seasonal wetness, a very plastic and clayey subsoil in some areas and a thin subsoil in others, and low natural fertility. Most of the area is in woodland. A few areas are cleared and mainly used for pasture or homesites. Much of the association is suitable for improved pasture. With appropriate sewage disposal facilities, the association has potential for use as homesites, but a high shrink-swell potential in the Creedmoor soils is a hazard for foundations and streets.

2. Madison-Pacolet association

Deep, well drained, gently sloping to moderately steep soils that have a subsoil dominantly of clay or clay loam; on uplands

This association makes up about 25 percent of the ocunty. The soils are mainly sloping and gently sloping.

Madison soils make up about 45 percent of the association, and Pacolet soils about 30 percent. Both soils have a dominantly red, clayey subsoil, and both are generally on the same landscape position, but each formed in residuum weathered from different parent material.

Minor soils make up about 25 percent of the association. These include Bolling, Monacan, Appling, Cecil, Colfax, Louisburg, Tallapoosa Variant, and Wedowee soils. The Bolling, Colfax, and Monacan soils are along drainageways and are at the mouth of drainageways. They are seasonally wet. The Appling, Cecil, and Wedowee soils have characteristics similar to those of the Madison and Pacolet soils. The Louisburg and Tallapoosa Variant soils are on narrow ridges and side slopes and are dominantly steep and moderately steep. They are shallower to bedrock than the Madison or Pacolet soils.

This association is well suited to farming and woodland. Most of the association is wooded, but some areas are used for crops and pasture. The major crops are corn, soybeans, small grains, and hay. The pasture is mostly used by beef cattle. The association has potential for residential development and other nonfarm uses.

3. Wedowee-Pacolet-Madison association

Deep, well drained, gently sloping to steep soils that have a subsoil dominantly of clay or clay loam; on uplands

This association makes up about 24 percent of the county. The soils are dominantly sloping and gently sloping.

Wedowee soils make up about 45 percent of the association, Pacolet soils about 20 percent, and Madison soils about 10 percent. All three soils have a dominantly clayey subsoil, and all three are on the same general position on the landscape.

Minor soils make up about 25 percent of the association. They include the Bolling, Sedgefield, Monacan, Forestdale, Louisburg, Tallapoosa Variant, Vance, Wilkes, Appling, and Cecil soils.

This association is well suited to farming and woodland, and most areas are wooded. Some areas are

cleared and used as pasture for beef cattle or for hay production. A few areas are used for corn, soybeans, and small grain. The association has potential for residential development and other nonfarm uses.

4. Tatum-Nason association

Deep, well drained, gently sloping to moderately steep soils that have a subsoil dominantly of clay, silty clay, or silty clay loam; on uplands

This association makes up about 7 percent of the county. The soils are dominantly gently sloping and sloping.

Tatum soils make up about 60 percent of the association, and Nason soils about 13 percent. Both have a clayey subsoil.

The remaining 27 percent of this association includes wetter Bolling, Monacan, and Forestdale soils and well drained Pacolet, Wedowee, and Madison soils.

Most of this association is wooded. If properly managed, the soils are suited to farming and pasture, but very little acreage is farmed. The major enterprise in this association is the production of pulpwood and timber. The association has potential for many nonfarm uses.

5. Wedowee-Sedgefield-Vance association

Deep, well drained and moderately well drained, gently sloping to steep soils that have a subsoil dominantly of clay or sandy clay; on uplands

This association makes up about 9 percent of the county. The soils are dominantly gently sloping and sloping.

Wedowee soils make up about 35 percent of the association. They are well drained, gently sloping to steep soils that have a dominantly clayey subsoil. Sedgefield soils make up 30 percent of the association. They are moderately well drained, gently sloping and sloping soils with a firm or very firm, clayey subsoil. Vance soils make up 15 percent of the association. They are well drained, gently sloping and sloping soils that have a very firm, clayey subsoil.

Minor soils make up about 20 percent of the association and include Bolling, Monacan, Appling, Cecil, Colfax, Enon, Louisburg, Madison, Pacolet, Wilkes, and Forestdale soils. The Bolling and Monacan soils are along drainageways and on flood plains of small drainageways. The Colfax and Forestdale soils are in low, wet areas.

This association is limited for farming by a seasonal high water table in the Sedgefield soils and the very firm subsoil of the Vance soils. The Wedowee soils are better suited to crops than most other soils in the association. Most of the association is in woodland. Some areas are cleared and used for pasture or are idle. The association is well suited to pasture. Much of the acreage is unsuitable for septic sewage disposal fields.

6. Fluvanna-Sedgefield-Georgeville association

Deep, well drained and moderately well drained, gently sloping and sloping soils that have a subsoil dominantly of clay or sandy clay; on uplands

This association makes up about 5 percent of the county. Much of the acreage is near the city of Richmond.

Fluvanna soils make up about 35 percent of the association. They are well drained soils with a dominantly very firm, plastic and clayey subsoil. Sedgefield soils make up about 15 percent of the association. They are moderately well drained soils with a dominantly firm or very firm, clayey subsoil. Georgeville soils make up about 12 percent of the association. They are well drained soils with a dominantly firm or very firm, clayey subsoil.

Minor soils make up about 38 percent of the association. These include Bolling, Monacan, Appling, Colfax, Louisburg, and Forestdale soils. The Bolling and Monacan soils are on flood plains. The Colfax and Forestdale soils are in low, wet areas.

Most areas of this association are wooded. The well drained, gently sloping parts of the association are well suited to crops, pasture, and hay, but only a small area of the association, mainly in the northern part, is used for farming. The Sedgefield soils are not as well suited to farming as the other soils in the association.

Much of this association is subject to urban pressure from the Richmond area, and the soils have potential for urban uses. Most of the quarries in the county are in this association.

7. Enon-Wilkes-Madison association

Deep and moderately deep, well drained, gently sloping to steep soils that have a subsoil dominantly of clay, clay loam, or loam; on uplands

This association makes up about 10 percent of the county. The soils are dominantly sloping and gently sloping.

Enon soils make up about 30 percent of the association. They are gently sloping or sloping soils that have a very firm, clayey subsoil. Wilkes soils make up about 28 percent of the association. They have a thin, loamy subsoil. Madison soils make up about 15 percent of the association and have a clayey subsoil.

Minor soils make up about 27 percent of this association. These include Monacan, Bolling, Louisburg, Orange, Tallapoosa Variant, and Wedowee soils. The Bolling and Monacan soils are on flood plains of small drainageways. The Louisburg and Tallapoosa Variant soils are on narrow ridges and side slopes and are dominantly steep or moderately steep. The Orange soils are on broad flats or swales and are wet and sticky.

This association is mostly wooded, and logging is a major enterprise. Most of the cleared areas are in

pasture, a use to which the soils are well suited. If properly managed, the soils have potential for urban uses.

8. Monacan-Tuckahoe association

Deep, well drained to somewhat poorly drained, nearly level soils that have a subsoil dominantly of silt loam, silty clay loam, loam, or clay loam; on flood plains

This association makes up about 9 percent of the county. The association is about 41 percent moderately well to somewhat poorly drained, loamy Monacan soils and 16 percent loamy, well drained Tuckahoe soils.

The remaining 43 percent of the association is made up of the Bolling, Fork Variant, Roanoke, Wehadkee, and Pamunkey soils. The Bolling, Fork Variant, Roanoke, and Pamunkey soils are on low terraces, and the Wehadkee soils are on flood plains. Most of these soils are seasonally wet or subject to flooding.

This association is one of the best suited to farming in the county, and much of the association is cleared and cultivated. Most of the poorly drained Roanoke and Wehadkee soils and the somewhat poorly drained Monacan soils have been abandoned and allowed to return to woodland. Noxious weeds and flooding are the main hazards for farming in this association. Flooding is a severe hazard for most urban uses.

9. Masada-Turbeville-Pinkston association

Deep and moderately deep, well drained to excessively drained, gently sloping to steep soils that have a subsoil dominantly of sandy clay, clay loam, or clay; on river terraces and uplands

This association makes up about 2 percent of the county. The gently sloping and sloping soils in the association are on high terraces, and the sloping to steep soils are on uplands.

Masada soils make up about 26 percent of the association. They are deep, well drained, gently sloping and sloping soils on high terraces near the James River. Turbeville soils make up about 20 percent of the association. They are deep, well drained soils also on high terraces near the James River. Pinkston soils make up about 6 percent of the association. They are moderately deep, well drained to excessively drained, sloping to steep soils on side slopes.

The remaining 48 percent of the association is made up of Bourne, Colfax, Creekmoor, Bolling, Fork Variant, Roanoke, and Mayodan soils. Bourne and Colfax soils are at the heads of drainageways and on saddles. Mayodan and Creedmoor soils are on narrow ridges and side slopes along the contact point of terraces and uplands. Bolling, Fork Variant, and Roanoke soils are in depressions and small drainageways in terraces.

Most of this association is wooded. The soils are well suited to farming, but most of the area is being developed for residential use. Slope is the main limitation of the association for urban uses.

10. Turbeville-Madison association

Deep, well drained, gently sloping to steep soils that have a subsoil dominantly of sandy clay, clay loam, or clay; on river terraces and uplands

This association makes up about 4 percent of the county. The soils are dominantly gently sloping and sloping. The landscape consists of old river terraces at the highest elevations and residual soils at lower elevations and on steeper side slopes.

Turbeville soils make up about 28 percent of the association, and Madison soils about 25 percent. The Turbeville soils are gently sloping and sloping, formed in old alluvium, and are on high terraces. The Madison soils are gently sloping to steep, formed in material weathered from rock, and are on narrow ridges and side slopes. Both soils have a dominantly red, clayey subsoil.

The remaining 47 percent of the association is made up of Bolling, Hiwassee, Louisburg, Masada, Pacolet, and Wedowee soils. The Hiwassee, Masada, Pacolet, and Wedowee soils have characteristics similar to those of the Turbeville and Madison soils. The Bolling soils are along drainageways and at the mouth of drainageways. Louisburg soils are on steep slopes along drainageways and the James River.

This association is well suited to farming, and most areas are used for crops and pasture or for raising beef cattle. The soils are suited to corn, small grains, hay, and other crops commonly grown in the county. The association has areas with potential for many nonfarm uses, but some areas are too steep or too wet for those uses.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a profile that is almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. The Fluvanna series, for example, was named for Fluvanna County.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Fluvanna fine sandy loam, 2 to 7 percent slopes, eroded, is one of several phases within the Fluvanna series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes and undifferentiated groups.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Pinkston-Mayodan fine sandy loams, 15 to 25 percent slopes, eroded, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because there is little value in separating them. The pattern and proportion of the soils are not uniform. An area shown on the map has at least one of the dominant (named) soils or may have all of them. Madison, Pacolet and Wedowee clay loams, 25 to 45 percent slopes, severely eroded, is an undifferentiated group in this survey area.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. In the map unit *Udorthents-Quarries complex*, Quarries is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

2B—Appling fine sandy loam, 2 to 7 percent slopes. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are long and narrow. They range from 10 to 20 acres.

Typically, the surface layer is yellowish brown and light yellowish brown fine sandy loam about 9 inches thick. The subsoil is 39 inches thick. It is reddish yellow and yellowish red, firm clay and clay loam mottled with red and brownish yellow. The substratum is red and brownish yellow sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of Colfax and Vance soils that are generally less than 2 acres and that make up about 10 percent of the unit. These soils are mostly in slight depressions, on saddles, and around the heads of drainageways. Also included are small areas of soils with a surface layer of sandy clay loam that are on narrow ridges. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is good, but the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid or very strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to cultivated crops. The hazard of erosion is the main management concern. Tilth can be maintained or improved by returning crop residue to the soil and by plowing when the soil has the proper moisture content. The use of lime and fertilizer offsets acidity and increases fertility. If the soil is cultivated, minimum tillage, use of cover crops, contour tillage, and contour stripcropping help to reduce runoff and control erosion.

The soil is well suited to pasture plants that are commonly grown in the county. The main limitations are acidity and low fertility. Applying lime helps to lower acidity, and using fertilizer increases plant nutrients in the soil. Establishing and maintaining a mixture of grasses and legumes, prevention of overgrazing, and controlling weeds are the major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes and using rotational and

deferred grazing are the chief practices of pasture management.

This soil is suited to trees, and a large acreage is wooded. The soil is managed mostly for pine, oaks, and yellow poplar.

The moderate permeability of this soil limits the soil for urban use, especially for septic tank absorption fields. The clayey subsoil and low strength of the soil also limit its use for urban purposes. Stockpiling topsoil and controlling erosion are management concerns at construction sites. Capability subclass IIe.

3A—Bolling soils, 0 to 2 percent slopes. This deep, nearly level, moderately well drained soil is on low terraces along the James River. This soil is flooded occasionally for very brief periods. Areas of the soil are parallel to the stream channel and are long and narrow or broad. They range from 3 to 10 acres.

Typically, the surface layer is dark yellowish brown and dark brown silt loam about 11 inches thick. The surface layer, however, ranges from silt loam to fine sandy loam. The subsoil is mainly pale brown and grayish brown clay loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Fork Variant soils in low areas and depressions and areas of Pamunkey soils at slightly higher positions. Also included are areas of soils with a surface layer of fine sandy loam. Included soils make up about 10 percent of the map unit.

The permeability of this soil is moderate, and available water capacity is high. Runoff is slow. Organic matter content is moderate. The subsoil is friable and has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The soil is very strongly acid to neutral unless lime has been applied. A seasonal high water table is at a depth of 18 to 30 inches in this soil in late winter and early spring.

This soil is well suited to cultivated crops and to pasture and hay crops. Alfalfa is short lived because of seasonal wetness. Water tends to pond for short periods in depressions, and such areas are usually difficult to drain. Tilth can be maintained or improved by incorporating organic matter into the soil and by plowing when the soil has the proper moisture content.

This soil is well suited to pasture, especially tall grass-clover mixtures, and most of the acreage is in pasture. Wetness restricts grazing during late winter and early spring. Pasture plants on this soil respond well to applications of fertilizer.

The soil is well suited to trees, but only a small acreage is wooded. Wetness is a limitation to the use of equipment from late winter to early spring.

Flooding and seasonal wetness make this soil poorly suited to most urban uses. Capability subclass IIw.

3B—Bolling soils, 2 to 7 percent slopes. This deep, gently sloping, moderately well drained soil is on low terraces of the James River, along small drainageways, and at the mouth of small drainageways. The soil is flooded occasionally for very brief periods. Areas of this soil are parallel to the stream channel and are long and narrow. They mainly range from 3 to 20 acres, but some are as much as 60 acres.

Typically, the surface layer is dark yellowish brown and dark brown fine sandy loam about 11 inches thick. The surface layer, however, ranges from silt loam to fine sandy loam. The subsoil mainly is mottled, pale brown and grayish brown clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Fork Variant soils in low areas and Pamunkey soils on the highest part of landscape. Also included are areas of soils with a surface layer of silt loam. Included soils make up about 10 percent of the map unit.

The permeability of this soil is moderate, and available water capacity is high. Runoff is medium. Organic matter content is moderate. The subsoil is friable and has a moderate shrink-swell potential. The depth of the rooting zone extends to about 60 inches. The soil is very strongly acid to neutral unless lime has been applied. A seasonal high water table is at a depth of 18 to 30 inches in the soil in late winter and early spring.

This soil is well suited to cultivated crops and to pasture and hay. A small acreage is used for crops. Alfalfa is short lived because of seasonal wetness. The hazard of erosion is moderate when the soil is cultivated. Contour tilling, minimum tillage, and the establishment of grassed waterways help to prevent erosion. Tilth can be maintained or improved by incorporating organic matter into the soil and by plowing when the soil has the proper moisture content.

This soil is well suited to pasture, and most of the acreage is used for pasture. Tall grass-clover mixtures are suitable for this soil. Prevention of overgrazing, which causes erosion, is a major management concern.

The soil is well suited to trees, but only a small acreage is wooded. Seasonal wetness limits the use of equipment from late winter to early spring.

Flooding and seasonal wetness make the soil poorly suited to most urban uses. Capability subclass IIe.

4B—Bourne fine sandy loam, 2 to 7 percent slopes. This moderately well drained, gently sloping soil is on stream divides and saddles. Areas of the soil commonly range from 3 to 10 acres, but some are as much as 35 acres.

Typically, the surface layer and subsurface layer are light yellowish brown fine sandy loam 12 inches thick. The subsoil is 40 inches thick. It consists of 6 inches of light yellowish brown sandy clay loam, 10 inches of strong brown clay loam, and 24 inches of yellowish brown loam and yellowish red sandy clay loam. The part of the subsoil between depths of 28 to 52 inches is very hard and brittle and compact. The underlying material is

mottled dark red, brownish yellow, and light gray clay loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Colfax soil at the head of drainageways, Mayodan soil on knolls and narrow ridges, and Creedmoor soil along the outer edge of the areas of this Bourne soil. Also included are small areas of soils with slopes of more than 7 percent. Included soils make up about 15 percent of the map unit.

This soil has slow permeability and low available water capacity. Runoff is medium. Organic matter content is low. The subsoil has a low shrink-swell potential. Root growth and air and water movement are restricted to a depth of 28 inches by the brittle, compact part of the subsoil. The surface layer and subsoil are commonly strongly acid to extremely acid unless limed. A seasonal high water table is at a depth of 18 to 30 inches in this soil during winter and spring.

This soil is moderately well suited to cultivated crops and to pasture and hay. Open ditches help to drain water from the soil during winter and spring if suitable outlets are available. Tile drains are generally less effective than open ditches. The surface layer and the part of the subsoil above a depth of about 28 inches erode easily, and gullying is a hazard if runoff is not controlled. The use of lime and fertilizer improves the acidity and fertility of the soil. The use of rotational and deferred grazing is a major pasture management practice.

This soil is moderately well suited to woodland, and most of the acreage is wooded. The use of equipment is limited by excess water during winter and spring.

Urban use of this soil is limited by slow permeability and seasonal wetness. Foundation drainage helps prevent wet basements. Retaining the maximum amount of topsoil helps establish lawns and gardens. Capability subclass IIe.

5—Buncombe loamy fine sand. This excessively drained, nearly level soil is on islands in the James River and on the flood plain of the river, and the soil is frequently flooded. Areas of this soil are long and narrow and range from 3 to 50 acres.

Typically, the surface layer is dark brown loamy fine sand 7-inches thick. The underlying material is mainly yellowish brown loamy fine sand to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Tuckahoe soil that has a surface layer of dark brown loam or fine sandy loam. These areas make up about 5 percent of the map unit.

The permeability of this soil is rapid, available water capacity is low, and runoff is slow. Organic matter content is low. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The soil is medium acid to very strongly acid throughout.

Frequent flooding makes this soil poorly suited to most crops commonly grown in the county. Heavy fertilization is necessary to maintain fertility, and large amounts of organic matter must be added to the surface layer to maintain a moderate level.

Low fertility and flooding make this soil poorly suited to intensive grazing. The suitable types of pasture grasses on this soil are limited mainly to warm-season species such as bermudagrass, sericea lespedeza, and white clover. Cool-season species are suitable in a spring-and-fall grazing system.

This soil is well suited to trees, and much of the acreage is wooded. The use of equipment is limited because the soil is soft and loose.

Frequent flooding limits the soil for most urban uses. Capability subclass IIIs.

6B2—Cecil fine sandy loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on ridgetops. Most areas of the soil are elongated and range from 10 to 20 acres.

Typically, the surface layer is brown fine sandy loam about 9 inches thick. The subsoil is red clay 42 inches thick. The substratum is reddish yellow loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Vance soils on saddles between ridges and near the heads of drainageways. Also included are small areas of Pacolet and Madison soils. Included soils make up about 20 percent of the map unit.

The permeability of this soil is moderate, available water capacity is moderate, and runoff is medium. Organic matter content is low in the surface layer. The subsoil is firm and has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are strongly acid or very strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to most cultivated crops and to pasture and hay. Most of the acreage is used for crops. Erosion is a moderate hazard where this soil is cultivated. Contour tillage, minimum tillage, rotational cropping systems, and the use of grassed waterways help to control erosion. The organic matter level of the plow layer can be maintained by keeping crop residue on or near the surface. Lime and fertilizer as needed help lower acidity and increase the fertility of the soil.

The soil is suitable for year-round intensive grazing and for woodland. Suitable pasture plants include orchardgrass, tall fescue, and alfalfa. Lime and fertilizer help reduce acidity and improve fertility of the soil.

The clayey subsoil and low strength of this soil are limitations for some urban uses. Controlling erosion and stockpiling topsoil at construction sites are major management concerns. Capability subclass IIe.

6C2—Cecil fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on side slopes. Most areas range from 5 to 10 acres and are irregularly shaped.

Typically, the surface layer is brown fine sandy loam 6 inches thick. The subsoil is mostly red clay 42 inches thick. The substratum is reddish yellow loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of severely eroded soils that have a surface layer of clay loam and small areas of Madison and Pacolet soils. Included soils make up 0 to 20 percent of this map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is rapid. The soil has low organic matter content. The subsoil is firm and has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are strongly acid or very strongly acid unless lime has been applied.

This soil is moderately well suited to most cultivated crops and to pasture and hay. Most of the acreage of the soil is used for crops. Erosion is the main hazard if this soil is cultivated. Erosion control measures include contour farming, minimum tillage, and the use of close-growing crops and terraces or diversions.

Tilth is easily maintained in the soil except in small, severely eroded spots where the plow layer consists mostly of material from the subsoil. Turning under barnyard manure and crop residue provides a supply of organic matter and helps improve tilth. Even when this soil is well managed, the supply of organic matter in the surface layer is rapidly depleted.

The soil is suitable for intensive year-round grazing. Suitable pasture plants include ladino clover, red clover, orchardgrass, tall fescue, and timothy. The use of lime and fertilizer helps to lower acidity and improve the fertility of the soil, and rotational and deferred grazing help prolong the life and maintain the productivity of the pasture.

This soil is moderately well suited to woodland, especially to loblolly pine. Prevention of fire is the main woodland management concern.

Slope and permeability are the main limitations of the soil for most urban and recreational uses. Saving topsoil in preparation for reseeding lawns and controlling erosion on construction sites are major management concerns. Capability subclass IIIe.

7B—Colfax fine sandy loam, 2 to 7 percent slopes. This gently sloping, moderately well drained to somewhat poorly drained soil is on smooth divides between large drainage systems, is at the foot of slopes along drainageways, and is around the head of intermittent drainageways. Most areas range from 3 to 10 acres, but in the eastern part of the county some are as much as 20 to 30 acres. The areas are generally long and narrow.

Typically, the surface layer is a gray fine sandy loam 7 inches thick. The subsurface layer is pale yellow fine sandy loam 3 inches thick. The subsoil is 34 inches thick. The upper 11 inches of the subsoil is yellowish brown clay loam. The lower 23 inches is a brittle, compact layer of pale yellow clay loam. The underlying material extends to a depth of 60 inches or more. It is strong brown, strongly weathered rock that crushes to fine sandy loam.

Included with this soil in mapping are small areas of Forestdale soils in drainageways and depressions and small areas of Sedgefield soils. Included soils make up about 20 percent of the map unit.

Permeability is slow in this soil, and available water capacity is low. Runoff is medium. Organic matter content is low. The shrink-swell potential of the subsoil is low to moderate. The root zone extends to a depth of 18 inches. The soil is strongly acid or very strongly acid unless limed. A perched seasonal water table is at a depth of 12 to 18 inches in the soil in late winter and in spring.

Open-ditch drainage and applications of lime and fertilizer are needed to make this soil suitable for cultivated crops or for pasture and hay. Because the root zone is only about 18 inches deep, erosion and gullying are major hazards. Deep-rooted pasture plants such as tall fescue are needed on this soil, and wetness makes grazing feasible only in summer. Many areas of the soil are used for pasture.

This soil is moderately well suited to woodland, and many areas are wooded. The suitable species are loblolly pine, Virginia pine, and sweetgum. Seasonal wetness limits the use of equipment.

The slow permeability and seasonal wetness make this soil poorly suited to most urban uses. Downslope movement of water along the top of the firm part of the subsoil is a hazard to foundations. Bare areas of this soil are difficult to reseed because they are either too wet or too dry. Capability subclass IIIw.

7C—Colfax fine sandy loam, 7 to 15 percent slopes. This sloping, moderately well drained to somewhat poorly drained soil is at the foot of slopes and around the head of intermittent drainageways. Most areas range from 3 to 5 acres and are long and narrow.

Typically, the surface layer is gray fine sandy loam 7 inches thick. The subsurface layer is pale yellow fine sandy loam 3 inches thick. The subsoil is 34 inches thick. The upper 11 inches of the subsoil is yellowish brown clay loam. The lower 23 inches is a brittle, compact layer of pale yellow clay loam. The underlying material extends to a depth of 60 inches or more. It is strong brown, strongly weathered rock that crushes to fine sandy loam.

Included with this soil in mapping are small areas of Forestdale soils in drainageways and depressions and

small areas of Sedgefield soils. Included soils make up about 20 percent of the map unit.

Permeability is slow in this soil, available water capacity is low, and runoff is medium to rapid. Organic matter content is low. The shrink-swell potential of the subsoil is low to moderate. The root zone extends to a depth of about 18 inches. The soil is strongly acid or very strongly acid unless limed. The soil has a perched seasonal water table at a depth of 12 to 18 inches in late winter and in spring. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. The soil is better suited to small grains than to row crops. Because the root zone is shallow in this soil, control of erosion is a major management concern. Contour tillage, minimum tillage, rotational cropping, and, in places, grassed waterways help to reduce runoff and erosion. Lime and fertilizer help to reduce acidity and improve fertility. Wetness makes grazing feasible only during late spring and in summer. Deep-rooted grasses such as tall fescue are suitable for pasture, and much of the acreage of the soil is used for grazing.

The soil is moderately well suited to trees, and much of the acreage is wooded. The major species include loblolly pine, Virginia pine, and sweetgum. Seasonal wetness limits the use of equipment.

Slope, slow permeability, and seasonal wetness limit the soil for most urban uses. Downslope seepage is common on this soil. The severe erosion hazard at construction sites makes it necessary to disturb the soil as little as possible, to provide for early seeding of grass, and to establish debris basins. Capability subclass IIIe.

8B—Creedmoor fine sandy loam, 2 to 7 percent slopes. This gently sloping, moderately well drained soil is on broad ridgetops and on sides of narrow ridgetops in the eastern part of the county. The average size of the areas is 25 acres, but they range from 5 to 400 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 2 inches thick, and the subsurface layer is pale yellow fine sandy loam about 4 inches thick. The subsoil is dominantly yellowish red and strong brown, very sticky clay 36 inches thick. The underlying material is mottled, yellow sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of soils in which the combined thickness of the surface layer and subsoil is less than 30 inches. Also included are a few areas of soils that are less than 5 feet deep to bedrock. Included soils make up about 10 percent of the map unit.

The permeability of this soil is very slow, available water capacity is moderate, and runoff is medium. The soil has low organic matter content. The subsoil is firm and has a high shrink-swell potential. The root zone extends to a depth of about 60 inches. The soil is extremely acid to strongly acid unless limed. It has a seasonal water table at a depth of 12 to 24 inches during late winter and early spring.

The suitability of this soil for cultivated crops is limited by the clay subsoil, seasonal wetness, and the hazard of erosion. Planting is sometimes delayed because of wetness, and erosion is a concern mainly where long slopes are cultivated. Small grains are better suited to this soil than row crops. Tilling on the contour, planting sod, including an adequately fertilized close-growing crop in the cropping sequence, and establishing grassed waterways help to control erosion. Tile drainage is generally unsuitable for this soil because of slow permeability and the high shrink-swell potential in the subsoil.

Wetness during the cool season makes grazing feasible only in late spring and in summer. Deep-rooted plants such as tall fescue are suitable for this soil. The use of lime and fertilizer, especially during the grazing season, helps reduce acidity and improve fertility.

This soil is moderately well suited to trees, and most of the acreage is wooded. Seasonal wetness limits equipment use. The major suitable species include loblolly pine, sweetgum, and yellow poplar (fig. 1).

The very slow permeability, the high shrink-swell potential of the subsoil, and seasonal wetness severely limit the soil for many urban uses. Capability subclass IIe.

8B2—Creedmoor fine sandy loam, 2 to 7 percent slopes, eroded. This gently sloping, moderately well drained soil is on broad ridgetops and on the sides of narrow ridgetops in the eastern part of the county. The average size of the areas is 20 acres, but they range from 5 to 320 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 2 inches thick, and the subsurface layer is pale yellow sandy loam about 4 inches thick. The subsoil is dominantly yellowish red and strong brown, very sticky clay 42 inches thick. The underlying material is mottled, yellow sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of soils in which the subsoil is less than 30 inches thick and areas of soils that are less than 5 feet deep to bedrock. Included soils make up about 10 percent of the map unit.

The permeability of this soil is very slow, available water capacity is moderate, and runoff is medium. The hazard of erosion is severe. This soil has low organic matter content. The subsoil is very firm and has a high shrink-swell potential. The root zone extends to a depth of about 60 inches. The soil is extremely acid to strongly acid unless limed. It has a seasonal high water table at a depth of 12 to 24 inches in late winter and early spring.

The severe erosion hazard and thin topsoil make this soil better suited to close-growing crops than to row crops. Minimum tillage and using grassed waterways in

places help to control erosion. Tilth can be maintained or improved by incorporating organic matter into the soil and by plowing when the soil has the proper moisture content.

Wetness prevents grazing on this soil during the cool months. Pastures on this soil need deep-rooted plants such as tall fescue and need fertilization during the growing season. Open-ditch drainage helps remove water from the soil.

This soil is moderately well suited to trees, and most of the acreage is wooded. The suitable species include loblolly pine, sweetgum, and yellow poplar. Seasonal wetness limits the use of equipment.

Very slow permeability, the high shrink-swell potential of the subsoil, and seasonal wetness limit the soil for most urban uses. Foundations require special design. Lawns established on this soil are commonly too wet in spring and too dry in summer. Capability subclass IIIe.

8C—Creedmoor fine sandy loam, 7 to 15 percent slopes. This sloping, moderately well drained soil is on long, narrow side slopes in the eastern part of the county. Areas generally range from 3 to 10 acres, but some are as much as 20 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 6 inches thick, and the subsurface layer is pale yellow sandy loam about 4 inches thick. The subsoil is dominantly yellowish red to strong brown clay 42 inches thick. The underlying material is mottled, yellow sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of soils in which the subsoil is less than 30 inches thick and soils that are less than 5 feet deep to bedrock. Included soils make up about 10 percent of the map unit.

The permeability of this soil is very slow, available water capacity is moderate, and runoff is rapid. The soil has low organic matter content. The subsoil is very firm and has a high shrink-swell potential. The hazard of erosion is severe. The root zone extends to a depth of about 60 inches. The soil is extremely acid to strongly acid unless limed. It has a seasonal water table at a depth of 12 to 24 inches in late winter and early spring.

This soil is moderately well suited to cultivated crops and to pasture and hay. It is better suited to small grains than to row crops. Erosion can be controlled in cultivated areas by tilling on the contour, minimum tillage, including an adequately fertilized close-growing crop in the cropping sequence, and using grassed waterways in some places.

Wetness prevents grazing on this soil during the cool months. Pastures on this soil need deep-rooted plants such as tall fescue and need fertilization during the growing season.

This soil is moderately well suited to trees, and most of the acreage is wooded. The suitable species include loblolly pine, sweetgum, and yellow poplar. Seasonal wetness limits the use of equipment.

Slope, very slow permeability, the high shrink-swell potential of the subsoil, and seasonal wetness limit the soil for most urban uses. Capability subclass IIIe.

8C2—Creedmoor fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, moderately well drained soil is on long, narrow side slopes. Areas generally range from 3 to 10 acres, but some are as much as 20 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 2 inches thick, and the subsurface layer is pale yellow sandy loam 4 inches thick. The subsoil is dominantly yellowish red to strong brown clay 42 inches thick. The underlying material is mottled, yellow sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of soils that have a thinner subsoil than this Creedmoor soil and areas of soils that are less than 5 feet deep to bedrock. Included soils make up about 10 percent of the map unit.

The permeability of this soil is very slow, available water capacity is moderate, and runoff is rapid. The hazard of erosion is severe. The soil has low organic matter content. The subsoil is very firm and has a high shrink-swell potential. The root zone extends to a depth of about 60 inches. The soil is extremely acid to strongly acid unless limed. It has a seasonal water table at a depth of 12 to 24 inches in late winter and early spring.

The hazard of erosion makes this soil poorly suited to most cultivated crops.

Wetness prevents grazing on this soil during the cool months. Pastures on this soil need deep-rooted plants such as tall fesuce. The use of lime and fertilizer, especially during the growing season, helps reduce acidity and improves soil fertility.

This soil is moderately well suited to trees. Suitable species include loblolly pine, sweetgum, and yellow poplar. The use of equipment is limited by seasonal wetness.

Very slow permeability, the high shrink-swell potential in the subsoil, slope, seasonal wetness, and erosion at construction sites limit the soil for most urban uses. Capability subclass IVe.

9B—Enon fine sandy loam, 2 to 7 percent slopes. This gently sloping, well drained soil is on low ridges, on toe slopes, and in shallow basins. Areas generally range from 10 to 20 acres and are irregularly shaped.

Typically, the surface layer is yellowish brown fine sandy loam about 9 inches thick. The subsoil is dominantly yellowish brown clay 13 inches thick. The underlying material is yellowish brown clay loam to a depth of 30 inches and is strongly weathered rock from 30 inches to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Wilkes soil on the end of narrow ridges and Orange soil in depressions and along drainageways. Included soils make up about 20 percent of this map unit.

The permeability of this soil is slow, available water capacity is moderate, and runoff is medium. The soil has low organic matter content. The subsoil is very firm and has a high shrink-swell potential. The root zone extends to a depth of about 36 inches. The soil is slightly acid to neutral.

This soil is moderately well suited to cultivated crops. The soil is commonly wet in spring and dry in summer, and early planting is sometimes delayed because of wetness. Erosion is the chief hazard if this soil is cultivated. Tilling on the contour, planting sod, including adequately fertilized close-growing crops in the cropping sequence, and using grass waterways in places help to control erosion.

The soil is moderately well suited to hay or pasture. Using deep-rooted plants such as tall fescue, prevention of grazing during wet periods, and control of weeds are major pasture management concerns.

This soil is moderately well suited to trees, and most of the acreage is wooded. Suitable species include loblolly pine and Virginia pine. The clayey subsoil and erosion limit the use of timber equipment.

Slow permeability, the high shrink-swell potential of the subsoil, the hazard of erosion on construction sites, and a high clay content limit the soil for most urban uses. Capability subclass IIe.

9C2—Enon fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on narrow side slopes of low ridges. The areas range from 3 to 10 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 6 inches thick. The subsoil is about 16 inches of yellowish brown clay over 8 inches of yellowish brown clay loam. The underlying material is strongly weathered rock to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Wilkes soil at the end of ridges and Orange soil on concave side slopes. Included soils make up about 20 percent of the map unit.

The permeability of this soil is slow, available water capacity is moderate, and runoff is rapid. The soil has low organic matter content. The subsoil is very firm and has a high shrink-swell potential. The root zone extends to a depth of about 36 inches. The soil is slightly acid to neutral.

If erosion is controlled, the soil is moderately well suited to cultivated crops. Tilling on the contour, minimum tillage, using an adequately fertilized close-growing crop in the cropping sequence, and using grased waterways where needed help to prevent erosion.

This soil is moderately well suited to hay and pasture. Pastures on the soil need deep-rooted plants such as tall fescue and need applications of fertilizer during the growing season. Prevention of grazing when the soil is too wet and control of weeds are major pasture management concerns.

This soil is moderately well suited to trees, and most of the acreage is wooded. Suitable species include loblolly pine and Virginia pine. The clayey subsoil and erosion limit the use of timber equipment.

The hazard of erosion on construction sites, slow permeability, and the high shrink-swell potential in the subsoil are the main limitations of the soil for most urban uses. Capability subclass IIIe.

11B2—Fluvanna fine sandy loam, 2 to 7 percent slopes, eroded. This well drained, gently sloping soil is on long, broad slopes and convex ridges. The areas generally range from 3 to 10 acres, but some are as much as 40 acres.

Typically, the surface layer is mostly light yellowish brown fine sandy loam about 8 inches thick. The subsoil is strong brown and reddish yellow clay 37 inches thick. The underlying material is mottled silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Colfax, Forestdale, and Sedgefield soils at the heads of drainageways and in depressions, small areas of Georgeville soil on knolls and the crest of ridges, and small areas of soils that have a surface layer of loam or silt loam. Included soils make up about 20 percent of the map unit.

The permeability of this soil is moderately slow, available water capacity is moderate, and runoff is medium. The soil has low organic matter content. The subsoil has a moderate shrink-swell potential. The root zone is about 60 inches deep. The soil is strongly acid or very strongly acid unless limed. The hazard of erosion is moderate.

This soil is well suited to cultivated crops and to pasture and hay, and a few areas are used for crops or pasture. Lime and fertilizer help to reduce acidity and improve fertility, and returning crop residue to the soil maintains organic matter content. Contour tillage, stripcropping, minimum tillage, use of close-growing crops in the rotation, and the establishment of grassed waterways where needed help to control erosion. The soil is suitable for intensive year-round grazing.

This soil is moderately well suited to trees, and much of the acreage is wooded. The main species are loblolly pine, Virginia pine, and northern red oak. Protection from fire is the major management concern.

Moderately slow permeability and a clayey subsoil limit the soil for many urban uses. Seeding with grasses helps protect construction sites. Capability subclass IIe.

11C2—Fluvanna fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on smooth side slopes. Many of the areas are long and narrow. Most range from 3 to 10 acres, but some are as much as 20 acres.

Typically, the surface layer is mostly light yellowish brown fine sandy loam about 8 inches thick. The subsoil is strong brown and reddish yellow clay 37 inches thick. The underlying material is mottled silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Colfax and Sedgefield soils at the heads of drainageways and near the bottom of slopes along drainageways. Also included are well drained Georgeville soils near the top of slopes. Included soils make up about 20 percent of this map unit.

The permeability of this soil is moderately slow, available water capacity is moderate, and runoff is rapid. The soil has low organic matter content. The subsoil has moderate shrink-swell potential. The root zone is about 60 inches deep. The soil is strongly acid or very strongly acid unless limed.

This soil is moderately well suited to cultivated crops, and a few areas are farmed. Erosion is a major management concern and can be controlled by growing crops in contour strips, using minimum tillage, including an adequately fertilized close-growing crop in the cropping sequence, and using terraces or diversions to help reduce runoff. Good tilth is easily maintained except in small severely eroded spots where the plow layer consists mostly of material from the subsoil. Turning under barnyard manure and crop residue provides a supply of organic matter and helps to improve tilth. Even when the soil is well managed, the supply of organic matter in the surface layer depletes rapidly.

The soil is suitable for intensive year-round grazing, and a few areas are used for pasture. The use of lime and fertilizer helps to reduce acidity and improve fertility.

This soil is moderately well suited to trees. Most of the acreage is wooded. Loblolly pine, Virginia pine, and northern red oak are the main species. Protection from fire and prevention of overgrazing are major management concerns.

Moderately slow permeability, a high clay content in the subsoil, slope, the hazard of erosion on construction sites, and low strength limit the soil for most urban uses. Capability subclass IIIe.

12—Forestdale fine sandy loam. This nearly level, poorly drained soil is in irregularly shaped areas along drainageways and at the heads of drainageways. The areas commonly range from 3 to 15 acres, but some are as much as 50 acres.

Typically, the surface layer is dark grayish brown fine sandy loam 5 inches thick. The subsoil is 39 inches thick. The upper 9 inches of the subsoil is mostly mottled, grayish brown and light brownish gray clay loam and clay. The lower 30 inches is mostly gray clay. The underlying material consists of white sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Sedgefield and Colfax soils on higher areas. They make up 10 to 15 percent of the map unit.

The permeability of this soil is very slow, available water capacity is moderate, and runoff is very slow. The soil has moderate organic matter content. The subsoil is generally firm or very firm and has a high shrink-swell potential. The root zone extends to a depth of 40 inches or more. The surface layer, subsoil, and underlying material are medium acid to very strongly acid unless lime has been applied. Some areas of the soil have water ponded on the surface.

A seasonal high water table that is close to the surface during winter and spring and the lack of suitable drainage outlets make this soil generally unsuitable for crops. The clayey subsoil makes subsurface drainage difficult. Most areas used for pasture require surface drainage, but suitable outlets for surface drainage are difficult to locate on this soil. The soil is too wet for grazing from late fall to late spring. Summer grazing is feasible in some years because the soil is seldom droughty. A few areas are used for pasture.

This soil is well suited to woodland, and most areas are wooded. Sweetgum and sycamore are well suited to the soil, but the use of equipment is limited by long wet periods. Protection from overgrazing is a main management concern.

This soil is limited for most urban uses by wetness and low strength. Capability subclass Vw.

13A—Fork Variant soils, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is in depressions in low-lying terraces along the James River and larger streams. Areas of the soil are commonly irregularly oval or elongated. They mainly range from 5 to 20 acres, but some are as much as 70 acres.

Typically, the surface layer is yellowish brown silt loam about 10 inches thick. The subsoil is 36 inches thick. It is mostly mottled, light gray and brownish yellow clay loam and silty clay loam in the upper part and gray silty clay in the lower part. The underlying material is gray sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Bolling and Roanoke soils that make up about 10 to 15 percent of this map unit.

The permeability of this soil is moderately slow, and available water capacity is high. Runoff is slow, and some areas have water ponded on the surface. Tilth is good. The soil is moderate in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to medium acid unless lime has been applied. This soil is occasionally flooded for brief periods during the spring and early summer.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of

seasonal wetness. The major management concerns include the need to maintain or increase organic matter content, providing drainage, and controlling flooding. Minimum tillage, use of cover crops and lime and fertilizer, using grasses and legumes in the cropping system, and keeping crop residue on or near the surface are practices that increase organic matter and maintain the tilth and fertility of the soil.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Controlled grazing to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, the use of lime and fertilizer as needed, and artificial drainage are useful pasture management practices. If the pasture is overgrazed, some of the desirable grasses and legumes die out. Grazing during periods of seasonal wetness cuts up and compacts the surface layer.

This soil is well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods. The use of timber equipment is limited by seasonal wetness.

Seasonal wetness and flooding limit this soil for many urban uses. Capability subclass IIIw.

14B2—Georgeville fine sandy loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are generally elongated. They range from 4 acres to more than 10 acres.

Typically, the surface layer of this soil is brown loam about 4 inches thick. The subsoil is mostly red clay 48 inches thick. The substratum is red silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Fluvanna and Sedgefield soils that make up about 10 to 15 percent of this map unit. Also included, on the crest of ridges, are spots of gravelly soils and spots of severely eroded soils where the surface layer is yellowish red loam or clay loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to cultivated crops and to pasture and hay. The hazard of erosion and the low organic matter content are major management concerns. The use of lime and fertilizer helps to reduce acidity and improve fertility. Minimum tillage, the use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwood species.

Moderate permeability, slope, seepage, and low strength are the main limitations of this soil for urban use. Capability subclass IIe.

14C2—Georgeville fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are smooth and commonly complex. Areas of this soil are commonly elongated and range from 4 acres to over 20 acres.

Typically, the surface layer of this soil is brown loam about 4 inches thick. The subsoil is mostly red, friable clay 48 inches thick. The substratum is red silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Fluvanna and Sedgefield soils that make up about 10 to 15 percent of this map unit. Also included, on ridges and upper side slopes, are spots of gravelly soils and spots of severely eroded soils where the surface layer is yellowish red loam or silty clay loam. These make up about 5 percent of the unit.

Permeability is moderate in this soil, and available water capacity is moderate. Runoff is medium to rapid. Tilth is fair, but the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. The major management concerns are the hazard of erosion and the need to increase organic matter content. The use of lime and fertilizer reduces acidity and increases fertility. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer to offset the acidity and low natural fertility are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed for pine and hardwoods.

Moderate permeability and slope limit the soil for some

urban purposes, especially for septic tank absorption fields. Capability subclass IIIe.

15B2—Hiwassee loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 10 acres to over 30 acres.

Typically, the surface layer of this soil is dark reddish brown loam about 8 inches thick. The subsoil is mostly dark red, friable clay loam and clay to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Turbeville and Masada soils that make up about 10 to 15 percent of this map unit. Also included, on the crest of ridges, are spots of gravelly soils and spots of severely eroded soils where the surface layer is reddish brown and dark red clay loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is good, but the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to cultivated crops and to pasture and hay. Much of the acreage is farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer helps to offset the acidity and low natural fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Keeping crop residue on or near the surface increases organic matter content.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and some of the acreage is wooded. The soil is managed for pine and hardwoods.

The soil is limited for many urban purposes by low strength and by moderate permeability, which limits use for septic tank absorption fields. Capability subclass IIe.

16B2—Louisburg fine sandy loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and narrow. They range from 3 to 10 acres.

Typically, the surface layer of this soil is yellowish brown fine sandy loam about 8 inches thick. The subsoil is mostly yellowish brown, friable fine sandy loam 10 inches thick. The substratum is brownish yellow sandy loam 30 inches thick. Granite is at a depth of 48 inches.

Included with this soil in mapping are small, intermingled areas of Sedgefield, Wedowee, and Wilkes soils that make up about 10 to 15 percent of this map unit.

The permeability of this soil is rapid, and available water capacity is low. Runoff is medium. Tilth is good, but the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 48 inches. The surface layer and subsoil are commonly very strongly acid to medium acid unless lime has been applied. Hard bedrock is commonly at a depth of 36 to 60 inches. The hazard of erosion is severe.

The hazard of erosion and the need to increase the organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Keeping crop residue on or near the surface increases the organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods.

Hard bedrock at a depth of 3 to 5 feet limits the soil for many urban purposes. Capability subclass IIIe.

16C2—Louisburg fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, somewhat excessively drained soil is on side slopes and ridgetops. Slopes are smooth and commonly complex. Areas of this soil are typically long and winding. They range from 3 acres to over 10 acres.

Typically, the surface layer of this soil is yellowish brown fine sandy loam about 8 inches thick. The subsoil is yellowish brown, friable fine sandy loam 10 inches thick. The substratum is brownish yellow sandy loam 30 inches thick. Granite is at a depth of 48 inches.

Included with this soil in mapping are small, intermingled areas of Sedgefield, Wedowee, and Wilkes soils that make up about 10 to 15 percent of this map unit.

The permeability of this soil is rapid, and available water capacity is low. Runoff is medium to rapid. Tilth is good, but the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 48 inches. The surface layer and subsoil are commonly very strongly acid to medium acid unless lime has been applied. Hard bedrock is commonly at a depth of 36 to 60 inches. The hazard of erosion is severe.

This soil is poorly suited to cultivated crops. It is better suited to close-growing crops or to pasture and hay than to row crops. The soil is droughty during the growing season. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion; keeping crop residue on or near the surface helps maintain or increase the organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods.

Hard bedrock at a depth of 3 to 5 feet limits the soil for many urban purposes. Capability subclass IVe.

16D2—Louisburg fine sandy loam, 15 to 25 percent slopes, eroded. This moderately steep, excessively drained soil is on side slopes. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 3 acres to over 15 acres.

Typically, the surface layer of this soil is yellowish brown fine sandy loam about 4 inches thick. The subsoil is mostly yellowish brown, friable fine sandy loam 10 inches thick. The substratum is brownish yellow sandy loam 24 inches thick. Granite is at a depth of 38 inches.

Included with this soil in mapping are small, intermingled areas of Wedowee and Wilkes soils that make up about 10 to 15 percent of this map unit.

The permeability of this soil is rapid, and available water capacity is low. Runoff is rapid. The soil is low in fertility and content of organic matter. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 38 inches. The surface layer and subsoil are commonly very strongly acid to medium acid unless lime has been applied. Hard bedrock is commonly at a depth of 36 to 60 inches. The hazard of erosion is severe.

This soil is moderately well suited to pasture and hay. The soil is droughty during the growing season. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer helps to offset the acidity and low fertility of the soil.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, and deferment of grazing are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods. The use of timber equipment is limited by slope, and erosion is a hazard during harvesting operations.

Slope and depth to bedrock limit the soil for most urban purposes, especially for septic tank absorption fields. Capability subclass VIe.

16E2—Louisburg fine sandy loam, 25 to 45 percent slopes, eroded. This steep, excessively drained soil is on side slopes of drainageways. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 3 acres to over 10 acres.

Typically, the surface layer of this soil is yellowish brown fine sandy loam about 4 inches thick. The subsoil is mostly yellowish brown, friable fine sandy loam 10 inches thick. The substratum is brownish yellow sandy loam 22 inches thick. Granite is at a depth of 36 inches.

Included with this soil in mapping are small, intermingled areas of Wedowee and Wilkes soils that make up about 10 to 15 percent of this map unit.

The permeability of this soil is rapid, and available water capacity is low. Runoff is rapid. The soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 36 inches. The surface layer and subsoil are commonly very strongly acid to medium acid. Hard bedrock is commonly at a depth of 36 to 60 inches. The hazard of erosion is severe.

This soil is poorly suited to crops or pasture. The soil is limited by slope, drought during the growing season, and the hazard of erosion. Maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, and deferment of grazing are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and most of the acreage is wooded. The soil is managed for pine and hardwoods. The use of timber equipment is limited by slope, and erosion during harvest operations is a concern. Slope is also the main limitation for most urban purposes. Capability subclass VIIe.

17B2—Madison fine sandy loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on ridgetops (fig. 2). Slopes are smooth and commonly complex. Areas of this soil are commonly elongated. They range from 10 acres to over 30 acres.

Typically, the surface layer of this soil is strong brown fine sandy loam about 6 inches thick. The subsoil is mostly red, firm clay 34 inches thick. The substratum is red and yellowish brown loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Tallapoosa Variant soils that make up about 10 to 15 percent of the map unit. Also included, on the crest of ridges, are spots of gravelly soil and spots of severely eroded soils where the surface layer is yellowish red or red clay loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is fair, but the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to cultivated crops, and much of the acreage is farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface maintains or increases organic matter content. The use of lime and fertilizer helps to offset the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

This soil is well suited to pasture and hay. Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, but only a small acreage is wooded. It is managed for pine and hardwoods.

The soil is well suited for many urban purposes, but the moderate permeability limits some uses and erosion is a major concern on construction sites. Capability subclass IIe.

17C2—Madison fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are smooth and commonly complex. Areas of this soil are parallel to the ridges and are elongated. They range from 10 to 30 acres.

Typically, the surface layer of this soil is strong brown fine sandy loam about 6 inches thick. The subsoil is mostly red, firm clay 34 inches thick. The substratum is red and yellowish brown loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Tallapoosa Variant soils that make up about 10 to 15 percent of this map unit. Also included on ridges and upper side slopes are spots of gravelly soils and spots of severely eroded soils where the surface layer is yellowish red or red clay loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium to rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay, and many areas are farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer helps to offset the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed mostly for pine and hardwoods.

Moderate permeability, slope, and erosion on construction sites limit the soil for many urban purposes. Capability subclass IIIe.

17D2—Madison fine sandy loam, 15 to 25 percent slopes, eroded. This moderately steep, well drained soil is on side slopes of drainageways. Slopes are smooth and complex. Areas of this soil are commonly long and winding. They range from 3 to 15 acres.

Typically, the surface layer of this soil is strong brown fine sandy loam about 6 inches thick. The subsoil is mostly red, firm clay 34 inches thick. The substratum is red and yellowish brown loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Louisburg and Tallapoosa Variant soils that make up 10 to 15 percent of this map unit. The Louisburg soil is mostly on the lower slopes and ends of ridges. Also included are spots of severely eroded soils where the surface layer is red or yellowish red clay loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil of this soil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is poorly suited to cultivated crops. It is better suited to close-growing crops or to pasture and hay than to row crops. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer helps to offset the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion; keeping crop residue on or near the surface maintains or increases organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and most of the acreage is wooded. The soils are managed for pine and hardwoods. The use of timber equipment is limited by slope, and erosion control is a management concern during harvesting operations.

Slope and the hazard of erosion on construction sites limit the soil for most urban uses. Capability subclass IVe.

18B3—Madison clay loam, 2 to 7 percent slopes, severely eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 10 acres to over 30 acres.

Typically, the surface layer of this soil is yellowish red clay loam about 5 inches thick. The subsoil is mostly red, firm clay 28 inches thick. The substratum is red and yellowish brown loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Tallapoosa Variant soils that make up about 10 to 15 percent of this map unit. Also included are spots of gravelly soils and small gullied areas that make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is poor, and the soil is low in fertility and organic matter. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied.

This soil is moderately well suited to cultivated crops and to pasture and hay, and some areas are farmed. The hazard of erosion and the need to increase organic matter content are the major management concerns. Keeping crop residue on or near the surface helps to maintain or increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and a moderate acreage is wooded. This soil is managed mostly for pine. The use of timber equipment is limited by the sticky texture of the surface layer.

Moderate permeability and the hazard of erosion on construction sites limit the soil for many urban purposes. Capability subclass IIIe.

18C3—Madison clay loam, 7 to 15 percent slopes, severely eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are mainly smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 10 to 30 acres.

Typically, the surface layer of this soil is yellowish red clay loam about 5 inches thick. The subsoil is mostly red, firm clay 23 inches thick. The substratum is red and yellowish brown loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Tallapoosa Variant soils that make up about 10 to 15 percent of the map unit. Also included are small gullied areas that make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium to rapid. Tilth is poor, and the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is poorly suited to cultivated crops. It is better suited to close-growing crops or to pasture and hay than to row crops. A few areas are farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and some of the acreage is wooded. The soil is managed mostly for pine. The use of timber harvesting equipment on this soil is limited by the sticky texture of the surface layer, and erosion is a concern during harvesting operations.

This soil is limited for many urban purposes by moderate permeability, severe erosion, and slope. Capability subclass IVe.

18D3—Madison clay loam, 15 to 25 percent slopes, severely eroded. This moderately steep, well drained soil is on side slopes of drainageways. Slopes are mainly smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 3 to 15 acres.

Typically, the surface layer of this soil is yellowish red clay loam about 5 inches thick. The subsoil is mostly red, firm clay 23 inches thick. The substratum is red and yellowish brown loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Louisburg and Tallapoosa Variant soils. Also included are small areas of rock outcrop, small gullied areas, and small areas of gravelly soils. Inclusions make up about 10 to 15 percent of this map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is rapid. The soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

Slope and the hazard of erosion make the soil unsuited to cultivated crops. The soil, however, is moderately well suited to pasture and hay. The need to increase organic matter content, establishing and maintaining a mixture of grasses and legumes, and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and using lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed mostly for pine. The use of equipment for timber management is limited by the sticky texture of the surface layer and by slope. Erosion is a concern when harvesting equipment is used.

Slope and erosion on construction sites limit the soil for many urban uses. Capability subclass VIe.

19E3—Madison, Pacolet and Wedowee clay loams, 25 to 45 percent slopes, severely eroded. This unit consists of steep, well drained soils on side slopes along drainageways and small streams. The soils in the unit are mapped together because they have no major differences in use and management. Slopes are mainly smooth and complex. Areas of this unit are mainly long and winding and range from 3 to 15 acres. The areas generally consist of one of the major soils in the unit, but some consist of two or three. The mapped acreage of the unit is about 50 percent Madison soils, 20 percent Pacolet soils, 20 percent Wedowee soils, and 10 percent included soils.

Typically, the surface layer of the Madison soils is yellowish red clay loam about 5 inches thick. The subsoil is mostly red, firm clay 23 inches thick. The substratum is red and yellowish brown loam to a depth of 60 inches or more.

Typically, the Pacolet soils have a surface layer of yellowish red clay loam about 4 inches thick. The subsoil is mostly red, friable clay and clay loam 20 inches thick. The substratum is red sandy clay loam and loam to a depth of 60 inches or more.

Typically, the Wedowee soils have a surface layer of yellowish red clay loam about 4 inches thick. The subsoil is mostly yellowish red, firm clay 32 inches thick. The substratum is reddish yellow clay loam and loam to a depth of 60 inches or more.

Included with these soils in mapping are small, intermingled areas of Tallapoosa Variant and Louisburg soils and gullied areas.

The permeability of these soils is moderate, and available water capacity is moderate. Runoff is very rapid. The soils are low in fertility and organic matter content. The subsoil of each has a low to moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil of these soils are commonly strongly acid to very strongly acid. The hazard of erosion is severe.

Slope, erosion, and droughtiness make these soils unsuitable for cultivated crops, but the soils are moderately well suited to pasture. Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, and deferment of grazing are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soils are moderately well suited to trees, and most of the acreage is wooded. The soils are managed mostly for pine. The use of timber equipment is limited by slope, and erosion is a concern when harvesting equipment is used.

These soils are limited for most urban uses by slope. Capability subclass VIIe.

21B—Masada fine sandy loam, 2 to 7 percent slopes. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are elongated or irregularly rectangular. They range from 4 acres to over 30 acres.

Typically, the surface layer of this soil is dark grayish brown and yellowish brown fine sandy loam about 9 inches thick. The subsoil extends to a depth of 60 inches or more. It is mostly strong brown, firm sandy clay that is strongly mottled at a depth of more than 41 inches.

Included with this soil in mapping are small, intermingled areas of Appling and Turbeville soils that make up about 10 to 15 percent of this map unit. Also included are small areas of soils that have a gravelly surface layer. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is fair, but the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell

potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to cultivated crops and to pasture and hay. Most of the acreage is farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface helps to maintain or increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and some of the acreage is wooded. The soil is managed for pine and hardwoods.

The moderate permeability and moderate shrink-swell potential limit the soil for many urban uses. Capability subclass IIe.

21C—Masada fine sandy loam, 7 to 15 percent slopes. This sloping, well drained soil is on ridgetops and side slopes. Slopes are smooth and commonly complex. Areas of this soil are elongated or irregularly rectangular. They range from 4 acres to over 30 acres.

Typically, the surface layer of this soil is dark grayish brown and yellowish brown fine sandy loam about 9 inches thick. The subsoil extends to a depth of 60 inches or more. It is mostly strong brown, firm sandy clay that is strongly mottled at a depth of more than 41 inches.

Included with this soil in mapping are small, intermingled areas of Appling and Turbeville soils. Also included are areas of soils that have a gravelly surface layer. Included soils make up 10 to 20 percent of this map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium to rapid. Tilth is fair, but the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay, and much of the acreage is farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface maintains or increases organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and some of the acreage is wooded. The soil is managed for pine and hardwoods.

Moderate permeability, the moderate shrink-swell potential, and slope limit the soil for many urban uses. Capability subclass IIIe.

22B—Mayodan fine sandy loam, 2 to 7 percent slopes. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 5 to 15 acres.

Typically, the surface layer is light yellowish brown fine sandy loam about 7 inches thick. The subsoil is strong brown, reddish yellow, and yellowish red clay 38 inches thick. The substratum is loam to a depth of 60 inches or more. It is strong brown to a depth of 58 inches and yellowish red at a depth of more than 58 inches.

Included with this soil in mapping are small, intermingled areas of Creedmoor and Colfax soils in slight depressions and along small drainageways. These inclusions make up 10 to 15 percent of the map unit.

Permeability is moderate in this soil, available water capacity is moderate, and runoff is medium. The soil has low organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 50 inches. The surface layer and subsoil are strongly acid or very strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to cultivated crops and to pasture and hay. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface maintains or increases organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil; large amounts of lime are needed to reduce the acidity. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, especially pine and hardwoods, but only a small acreage is wooded.

The soil is limited for some urban uses because of moderate permeability, but much of the acreage is used for residential development. Erosion on construction sites is a major concern, and the acidity of the soil limits the establishment of lawns. Capability subclass IIe.

22C2—Mayodan fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on side slopes. Slopes are smooth and commonly complex. Areas of this soil are generally long and winding and generally range from 5 to 20 acres.

Typically, the surface layer is light yellowish brown fine sandy loam about 5 inches thick. The subsoil is strong brown, reddish yellow, and yellowish red clay 38 inches thick. The substratum is loam to a depth of 60 inches or more. It is strong brown to a depth of 58 inches and yellowish red at a depth of more than 58 inches.

Included with this soil in mapping are small, intermingled areas of Creedmoor and Pinkston soils. The Creedmoor soils are along small drainageways, and the Pinkston soils are commonly on the more sloping part of the side slopes. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderate in this soil, available water capacity is moderate, and runoff is medium to rapid. Organic matter content is low. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 50 inches. The surface layer and subsoil are strongly acid or very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil; large amounts of lime are needed to reduce the acidity. If this soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, especially pine and hardwood species.

Moderate permeability, slope, and erosion on construction sites limit this soil for many urban uses, but much of the acreage is used for residential development. The acidity of this soil limits the establishment of lawns. Capability subclass IIIe.

23—Monacan silt loam. This nearly level, moderately well drained and somewhat poorly drained soil is on flood plains along streams and large drainageways. Areas of this soil are commonly elongated and range from 5 acres to over 100 acres.

Typically, the surface layer of this soil is dark yellowish brown silt loam about 12 inches thick. The subsoil extends to a depth of 60 inches or more. It is mostly mottled, dark yellowish brown silt loam to a depth of 34 inches; grayish brown, friable silty clay loam between depths of 34 and 42 inches; and gray, firm clay at a depth of more than 42 inches.

Included with this soil in mapping are small, intermingled areas of Tuckahoe and Wehadkee soils that make up about 10 to 15 percent of the map unit. The Tuckahoe soils are typically between areas of this Monacan soil and the stream. The Wehadkee soils are commonly between areas of this Monacan soil and adjacent uplands. Also included are spots of sandy and gravelly soils which make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is high. Runoff is slow. Tilth is good, and the soil is moderately high in natural fertility and moderate in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly neutral to strongly acid. This soil is frequently flooded for brief periods during the spring and early summer, and it has a seasonal high water table during winter and spring.

This soil is well suited to cultivated crops and to pasture and hay. Some of the acreage is farmed. Flooding is a major concern, but it normally occurs early enough so that summer crops can be grown. Alfalfa is short lived because of seasonal wetness. The use of lime and fertilizer and artificial drainage are suitable management practices. Minimum tillage, use of cover crops, keeping crop residue on or near the surface, and including grasses and legumes in the cropping system help to increase organic matter content and maintain tilth.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing and control of flooding are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, use of lime and fertilizer, and artificial drainage are useful pasture management practices. If the pasture is overgrazed, some of the desirable grasses and legumes die out, and grazing during periods of seasonal wetness often cuts up and compacts the surface layer.

The soil is well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods. Seasonal wetness and flooding are the main limitations for tree production.

The seasonal high water table and flooding limit the soil for most urban uses. Capability subclass IIIw.

24—Monacan complex. This complex consists of nearly level, well drained to poorly drained soils that are so intermingled that it was not practical to map them separately. The soils are on flood plains along streams and large drainageways throughout the county. Areas of this complex are long and narrow and range from 20 to 50 acres or more. Slopes are 0 to 2 percent. This complex is about 60 percent Monacan soils, 20 percent Wehadkee soils, 10 percent Tuckahoe soils, and 10 percent included soils.

Typically, the surface layer of the Monacan soils is dark yellowish brown silt loam about 12 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled, dark yellowish brown silt loam between depths of 12 and 34 inches; grayish brown, friable silty clay

loam between depths of 34 and 42 inches; and gray, firm clay below a depth of 42 inches.

Typically, the Wehadkee soils have a surface layer of grayish brown silt loam about 9 inches thick. The subsoil is gray, friable loam 21 inches thick. The substratum is gray loamy sand and sandy loam to a depth of 60 inches or more.

Typically, the Tuckahoe soils have a surface layer of dark yellowish brown loam about 10 inches thick. The subsoil is mostly dark yellowish brown and brown silty clay loam and loam to a depth of more than 60 inches.

Included with this complex in mapping are small, intermingled areas of soils that have a surface layer of loamy sand, sandy loam, or clay loam. Also included are spots of gravelly and very gravelly soils.

The permeability of the soils of this complex is moderate, and available water capacity is high. Runoff is slow. Tilth is good, and the soils are moderately high in fertility and moderate in organic matter content. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly neutral to strongly acid. These soils are frequently flooded for brief periods during the spring and early summer. The Wehadkee soils have water ponded on the surface for varying periods after flooding or heavy rains.

The soils in this complex are moderately well suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of seasonal wetness. The major management concerns are the control of flooding and the need for artificial drainage. If these soils are cultivated, minimum tillage, use of cover crops, keeping crop residue on or near the surface, and including grasses and legumes in the cropping system help increase organic matter and maintain tilth.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, the use of lime and fertilizer, and artificial drainage are useful pasture management practices. If the pasture is overgrazed, some of the desirable grasses and legumes die out.

These soils are well suited to trees, and much of the acreage is wooded. The soils are managed for pine and hardwoods. Seasonal wetness and flooding are the main limitations for woodland.

Seasonal wetness and flooding limit the soil for many urban uses. Capability subclass IIIw.

25B2—Nason loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 4 to 50 acres.

Typically, the surface layer of this soil is yellowish brown and brown loam about 6 inches thick. The subsoil is mostly yellowish red, friable to firm silty clay 33 inches thick. The substratum is mottled yellowish red, red, reddish yellow, and white silty clay loam and silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Enon, Orange, and Tatum soils. The Enon soils have a yellowish brown subsoil and are around the heads of drainageways. The Orange soils are wetter than this Nason soil and are in slight depressions. The Tatum soils have more red in the subsoil than this Nason soil. Included soils make up about 15 percent of this map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is fair, but the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to cultivated crops and to pasture and hay. Some areas are farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface helps maintain or increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed mostly for pine.

Moderate permeability, a moderate shrink-swell potential, and erosion at construction sites limit the soil for many urban uses. The acidity of this soil limits the establishment of lawns. Capability subclass IIe.

25C2—Nason loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 3 to 50 acres.

Typically, the surface layer of this soil is yellowish brown and brown loam about 6 inches thick. The subsoil is mostly yellowish red, friable to firm silty clay 33 inches thick. The substratum is mottled yellowish red, red, reddish yellow, and white silty clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Enon, Orange, and Tatum soils. The Enon soils are on low ridges and around the heads of drainageways. The Orange soils are wetter than this Nason soil and are along small drainageways. The Tatum soils have more red in the subsoil than this Nason soil. Included soils make up about 10 to 15 percent of this map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium to rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface helps to maintain or increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and most of the acreage is wooded. The soil is managed mostly for pine.

Moderate permeability, a moderate shrink-swell potential, and slope limit the soil for many urban uses. The acidity of the soil limits the establishment of lawns. Erosion is a major concern on construction sites. Capability subclass IIIe.

25D2—Nason loam, 15 to 25 percent slopes, eroded. This moderately steep, well drained soil is on side slopes along drainageways. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 4 to 40 acres.

Typically, the surface layer of this soil is yellowish brown and brown loam about 6 inches thick. The subsoil is mostly yellowish red, friable to firm silty clay 33 inches thick. The substratum is yellowish red, red, reddish yellow, and white loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Enon and Tatum soils. The Enon soils are mostly around the heads of drainageways. Also included are small areas of severely eroded soils that have a surface layer of clay loam, small areas of soils that have a surface layer of sandy loam, and small spots of rock outcrop. Included areas make up about 15 percent of this map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is poorly suited to cultivated crops, but is better suited to close-growing crops or to pasture and hay than to row crops. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer as needed are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and most of the acreage is wooded. The soil is managed mostly for pine. Slope limits the use of timber equipment on this soil, and erosion is a hazard during logging operations.

Slope is the main limitation of the soil for many urban uses. Stabilization of slopes is a major concern at construction sites. Capability subclass IVe.

26B—Orange loam, 2 to 7 percent slopes. This gently sloping, somewhat poorly drained to moderately well drained soil is in small depressions, along drainageways, and on ridgetops. Slopes are smooth. Areas of this soil are irregularly oval or elongated. They range mainly from 5 to 15 acres.

Typically, the surface layer is grayish brown and light yellowish brown loam 10 inches thick. The subsoil is sticky clay and sandy clay 29 inches thick. The upper part of the subsoil is light yellowish brown, the middle part is light olive brown, and the lower part is pale olive. The substratum is pale yellow sandy clay loam to a depth of 51 inches and olive loam from 51 inches to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Enon, Sedgefield, and Vance soils that are better drained than this Orange soil. These inclusions make up about 10 to 15 percent of the map unit.

The permeability of this soil is slow, and available water capacity is moderate. Runoff is medium. Tilth is fair, and the soil is moderately high in fertility and low in organic matter content. The subsoil has a high shrink-swell potential. The root zone extends to a depth of about 60 inches, but root growth is restricted at a depth of about 10 inches by the very firm subsoil. The surface layer and subsoil are commonly medium acid to mildly alkaline. The hazard of erosion is moderate.

The soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of seasonal wetness. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface maintains or increases organic matter content. The use of lime and fertilizer and artificial drainage are suitable management practices. Minimum

tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, use of lime and fertilizer as needed, and artificial drainage are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed for pine and hardwoods. The use of timber equipment is limited by seasonal wetness.

Slow permeability, the high shrink-swell potential, and seasonal wetness limit this soil for many urban uses. Foundations of buildings are subject to cracking if subsoil material from this soil is used for backfill. Capability subclass IIIe.

26C—Orange loam, 7 to 15 percent slopes. This sloping, somewhat poorly drained to moderately well drained soil is in small depressions, along drainageways, and on small toe slopes. Slopes are smooth. Areas of this soil are irregularly oval or elongated. They range from 5 to 20 acres.

Typically, the surface layer is grayish brown and light yellowish brown loam about 10 inches thick. The subsoil is sticky clay and sandy clay 29 inches thick. The upper part of the subsoil is light yellowish brown, the middle part is light olive brown, and the lower part is pale olive. The substratum is pale yellow sandy clay loam to a depth of 51 inches and olive loam from 51 inches to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Enon, Sedgefield, and Vance soils that are typically better drained than this Orange soil. These soils make up about 10 to 15 percent of the map unit.

The permeability of this soil is slow, and available water capacity is moderate. Runoff is rapid. Tilth is fair, and the soil is moderate in fertility and low in organic matter content. The subsoil has a high shrink-swell potential. The root zone extends to a depth of about 60 inches, but root growth is restricted at a depth of about 10 inches by the very firm subsoil. The surface layer and subsoil are commonly medium acid to mildly alkaline. The hazard of erosion is severe.

The soil is poorly suited to cultivated crops, but it is moderately well suited to pasture and hay. Alfalfa is short lived because of seasonal wetness. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer as needed and artificial drainage are suitable management practices. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion, and keeping crop residue on or near the surface helps maintain or increase organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, the use of lime and fertilizer, and artificial drainage are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed for pine and hardwoods. The use of timber equipment on this soil is limited by seasonal wetness, and erosion is a hazard when harvesting equipment is used.

Slow permeability, the high shrink-swell potential, and seasonal wetness limit the soil for many urban uses. Foundations of buildings are subject to cracking if subsoil material from this soil is used for backfill. Capability subclass IVe.

27B2—Pacolet fine sandy loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on ridgetops in the Piedmont province. Slopes are smooth and commonly complex. Areas of this soil are elongated or long and winding. They range from 5 acres to over 30 acres.

Typically, the surface layer of this soil is reddish brown fine sandy loam about 4 inches thick. The subsoil is mostly red, friable clay loam or clay 30 inches thick. The substratum is red sandy clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Louisburg, Madison, Wedowee, and Vance soils. The Louisburg soils are commonly on knolls or at the edge of the slope. The Madison, Wedowee, and Vance soils are on the same landscape positions as this Pacolet soil. Also included are spots of soils that have a surface layer of clay loam. Included soils make up about 15 percent of this map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is good, but the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to cultivated crops and to pasture and hay. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface helps to maintain or increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed for pine and hardwoods.

The soil is generally suitable for urban use, but the moderate permeability is a limitation for some purposes. Capability subclass IIe.

27C2—Pacolet fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are smooth and commonly complex. Areas of this soil are elongated or long and winding. They range from 5 acres to over 40 acres.

Typically, the surface layer of this soil is reddish brown fine sandy loam about 4 inches thick. The subsoil is red, friable clay loam or clay 30 inches thick. The substratum is red sandy clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Louisburg, Madison, Wedowee, and Vance soils that make up about 10 to 15 percent of this map unit. The Louisburg soils are on the more sloping part of the side slopes or on slope breaks; the other soils occur at random on the landscape. Also included are spots of soils that have a surface layer of clay loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium to rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface helps to maintain or increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed for pine and hardwoods.

Slope limits the soil for many urban uses. Erosion at construction sites is a major concern. Capability subclass IIIe.

27D2—Pacolet fine sandy loam, 15 to 25 percent slopes, eroded. This moderately steep, well drained soil is on side slopes along drainageways. Slopes are smooth and commonly complex. Areas of this soil are elongated or long and winding. They range from 5 acres to over 15 acres.

Typically, the surface layer of this soil is reddish brown fine sandy loam about 4 inches thick. The subsoil is mostly red, friable clay loam or clay 30 inches thick. The substratum is red sandy clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Louisburg, Wedowee, and Madison soils that make up about 10 to 15 percent of this map unit. The Louisburg soils are on slope breaks and are near the crest of the slope. Also included are spots of soils that have a surface layer of gravelly sandy loam and spots of soils that have a surface layer of clay loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is poorly suited to cultivated crops, but it is better suited to close-growing crops or to pasture and hay than to row crops. The soil is droughty during the growing season. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion, and keeping crop residue on or near the surface helps to maintain or increase organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed for pine and hardwoods. The use of timber equipment is limited by slope, and the hazard of erosion increases during harvest operations.

Slope is the main limitation of the soil for urban uses. Stabilization of cut slopes is a concern at construction sites. Capability subclass IVe.

28B3—Pacolet clay loam, 2 to 7 percent slopes, severely eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are elongated or long and winding. They range from 4 acres to over 10 acres.

Typically, the surface layer of this soil is yellowish red clay loam about 4 inches thick. The subsoil is mostly red, friable clay loam or clay 26 inches thick. The substratum is red sandy clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Louisburg, Wedowee, Madison, and Vance soils that make up about 10 to 15 percent of this map unit. Also included are spots of soils with a surface layer of gravelly sandy loam that make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is poor, and the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. Erosion is the major management concern. The need to increase organic matter content is also a concern. Keeping crop residue on or near the surface helps maintain or increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and using grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed for pine and hardwoods. The use of timber equipment is limited by the sticky texture of the surface layer.

This soil is generally suitable for urban use, but the moderate permeability is a limitation for some uses. Placing topsoil on the severely eroded areas speeds the establishment of lawns. Capability subclass IIIe.

28C3—Pacolet clay loam, 7 to 15 percent slopes, severely eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are smooth and commonly complex. Areas of this soil are elongated or long and narrow. They range from 5 acres to over 20 acres.

Typically, the surface layer of this soil is yellowish red clay loam about 4 inches thick. The subsoil is mostly red, friable clay 26 inches thick. The substratum is red sandy clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Louisburg, Wedowee, Madison, and Vance soils that make up about 10 to 15 percent of this map unit. Also included are spots of soils with a surface layer of gravelly sandy loam that make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is rapid. Tilth is poor, and the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is poorly suited to cultivated crops, but is better suited to close-growing crops or to pasture and hay than to row crops. The soil is droughty during the growing season. The hazard of erosion is the major management concern. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion, and keeping crop residue on or near the surface helps maintain or increase organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fetilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and most of the acreage is wooded. The soil is managed mostly for pine. The use of timber equipment is limited by the sticky texture of the surface layer, and its use increases the erosion hazard.

Slope and the moderate permeability of the soil limit urban use. The severely eroded surface layer hinders the establishment of lawns. Capability subclass IVe.

28D3—Pacolet clay loam, 15 to 25 percent slopes, severely eroded. This moderately steep, well drained soil is on side slopes along drainageways. Slopes are smooth and commonly complex. Areas of this soil are elongated or long and winding. They range from 5 acres to over 10 acres.

Typically, the surface layer of this soil is yellowish red clay loam about 4 inches thick. The subsoil is mostly red, friable clay and clay loam 20 inches thick. The substratum is red sandy clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Louisburg, Wedowee, and Madison soils that make up about 10 to 15 percent of this map unit. Also included are spots of soils that have a surface layer of gravelly sandy loam and a few small gullied areas. These areas make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is rapid. The soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

Drought during the growing season and erosion make this soil unsuitable for cultivated crops; the soil is, however, moderately well suited to pasture and hay. The use of lime and fertilizer offsets the acidity and low fertility of the soil. The need to increase organic matter content, establishing and maintaining a mixture of grasses and legumes, and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, and deferment of grazing are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and most of the acreage is wooded. The soil is managed for pine and hardwoods. Slope limits the use of timber equipment and is the main limitation for many urban uses. Capability subclass VIe.

29A—Pamunkey loam, 0 to 4 percent slopes. This nearly level to very gently sloping, well drained soil is on low terraces along the larger streams. Areas of this soil are commonly elongated and narrow. They range from 5 to 10 acres.

Typicaly, the surface layer is dark brown loam about 9 inches thick. The subsoil is mostly brown silty clay loam to a depth of 60 inches or more. It is friable in the upper part and firm in the lower part.

Included with this soil in mapping are small low lying areas of Bolling soil that make up about 5 percent of this map unit. Also included are small areas of soils that do not flood.

The permeability of this soil is moderate, and available water capacity is high. Runoff is slow. The soil is moderate in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to slightly acid. This soil is occasionally flooded for brief periods during spring and early summer, but a few small areas are above the flood level.

This soil is well suited to cultivated crops and to pasture and hay, and most of the acreage is farmed. Flooding normally occurs early enough so that summer crops can be grown. The use of lime and fertilizer reduces acidity and increases fertility. Minimum tillage, use of cover crops, keeping crop residue on or near the surface, and including grasses and legumes in the cropping system help increase organic matter and maintain tilth.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, some of the desirable grasses and legumes die out.

The soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for yellow poplar, northern red oak, Virginia pine, and shortleaf pine.

This soil is limited for many urban uses by flooding. Capability subclass IIw.

31C2—Pinkston fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained to excessively drained soil is on side slopes and ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 5 to 10 acres.

Typically, the surface layer is dominantly light yellowish brown fine sandy loam about 7 inches thick. The subsoil is light yellowish brown loam 10 inches thick. The substratum is brownish fine sandy loam 18 inches thick. Weathered sandstone and shale are at a depth of 35 inches.

Included with this soil in mapping are small, intermingled areas of Creedmoor and Mayodan soils, both of which are deeper to rock than this Pinkston soil. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderately rapid in this soil, available water capacity is low, and runoff is rapid. Organic matter content is low. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 35 inches. The surface layer and subsoil are very strongly acid or strongly acid unless lime has been applied. The depth to hard bedrock ranges from 30 to 50 inches. The hazard of erosion is severe.

Low available water capacity and erosion make this soil poorly suited to cultivated crops, but the soil is better suited to close-growing crops or to pasture and hay than to row crops. The need to increase organic matter content is a major management concern. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of

cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion, and keeping crop residue on or near the surface maintains or increases organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed mostly for pine.

Hard bedrock at a depth of 30 to 50 inches and the moderately rapid permeability limit the soil for most urban uses (fig. 3). Droughtiness is a limitation for lawns and landscaping. Capability subclass IVe.

31E2—Pinkston fine sandy loam, 25 to 45 percent slopes, eroded. This steep, well drained to excessively drained soil is on side slopes. Slopes are smooth and commonly complex. Areas of this soil are commonly winding. They range from 3 acres to over 20 acres.

Typically, the surface layer is dominantly light yellowish brown fine sandy loam about 5 inches thick. The subsoil is light yellowish brown loam 10 inches thick. The substratum is brownish fine sandy loam 20 inches thick. Weathered sandstone and shale are at a depth of 35 inches.

Included with this soil in mapping are small areas of Mayodan soils that are deeper to bedrock than this Pinkston soil. Also included are areas of soils that have a gravelly or sandy surface layer. These sandy or gravelly soils are generally adjacent to areas of Turbeville and Masada soils. Included soils make up about 20 percent of the map unit.

Permeability is moderately rapid in this soil, available water capacity is low, and runoff is very rapid. Organic matter content is low. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 35 inches. The surface layer and subsoil are strongly acid or very strongly acid unless lime has been applied. The depth to bedrock ranges from 30 to 50 inches. The hazard of erosion is severe.

Low available water capacity and erosion make this soil unsuited to crops and poorly suited to pasture. Maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, and deferment of grazing are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed mostly for pine. Slope limits the use of timber equipment and is the main limitation for most urban uses. Capability subclass VIIe.

32D2—Pinkston-Mayodan fine sandy loams, 15 to 25 percent slopes, eroded. This complex consists of moderately steep, well drained to excessively drained soils on narrow side slopes. The areas generally range from 5 to 10 acres. The complex is about 65 percent Pinkston soils, 30 percent Mayodan soils, and 5 percent included soils. The soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Pinkston soils is dominantly light yellowish brown fine sandy loam 7 inches thick. The subsoil is light yellowish brown loam 10 inches thick. The substratum is brownish fine sandy loam 13 inches thick. Weathered sandstone and shale are at a depth of 30 inches.

Typically, the Mayodan soils have a surface layer of light yellowish brown fine sandy loam about 5 inches thick. The subsoil is strong brown, reddish yellow, and yellowish red clay 38 inches thick. The substratum is mottled, strong brown loam and yellowish red fine sandy loam to a depth of 60 inches or more.

Included with this complex in mapping are small areas of Creedmoor soils near the bottom of slopes. Also included are areas of soils with a sandy or gravelly surface layer that are adjacent to Turbeville or Masada soils.

Permeability in the Pinkston soils is moderately rapid, and available water capacity is low. Runoff is rapid on the Pinkston soils, and organic matter content is low. They have a low shrink-swell potential in the subsoil, and the rooting depth is about 30 inches. The surface layer and subsoil are commonly very strongly acid or strongly acid unless limed. The depth to hard bedrock ranges from 30 to 50 inches. The hazard of erosion is severe.

The permeability and available water capacity of the Mayodan soils are moderate. Runoff is rapid, and organic matter content is low. The subsoil of the Mayodan soils has a moderate shrink-swell potential, and the rooting depth is about 50 inches. The surface layer and subsoil are commonly strongly acid or very strongly acid unless limed. The hazard of erosion is severe.

Low available water capacity, erosion, and slope make these soils poorly suited to farming. A few areas are used for grazing, and the soils are better suited to warm-season pasture plants. The main management concern on these soils is the maintenance of a plant cover to promote intake of water and prevent erosion.

This complex is moderately well suited to woodland, and most of the acreage is wooded. The soils are managed mostly for pine and yellow poplar.

Slope and hard bedrock at a depth of 30 to 50 inches in the Pinkston soils limit this complex for most urban uses. Capability subclass VIe.

33—Roanoke silt loam. This nearly level, poorly drained soil is on terraces along the larger streams and drainageways. Areas of this soil are commonly elongated, but some are irregularly oval. The areas range from 3 acres to over 20 acres.

Typically, the surface layer is dark gray and light brownish gray silt loam about 9 inches thick. The subsoil is mostly gray, firm clay 41 inches thick. The substratum is light olive gray clay and mottled, gray and light yellowish brown sandy clay to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Bolling and Fork Variant soils that make up about 10 to 15 percent of this map unit. These soils are slightly higher than the adjacent Roanoke soils. Also included are spots of very poorly drained soils and soils that have water ponded on the surface. These make up about 5 percent of the unit.

The permeability of this soil is slow, and available water capacity is moderate. Runoff is slow. Tilth is generally good. The soil is wet and cold during the spring and early summer. It is moderate in fertility and moderate in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches but is seasonally restricted by wetness at a depth of about 35 inches. The surface layer and subsoil range from very strongly acid to strongly acid unless lime has been applied. The soil is frequently flooded for brief periods during winter and spring.

This soil is poorly suited to cultivated crops, but is moderately well suited to pasture and hay. Alfalfa is short lived because of seasonal wetness. Providing drainage is the main management concern. The use of lime and fertilizer reduces acidity and maintains fertility. If the soil is cultivated, the use of cover crops, keeping crop residue on or near the surface, and including grasses and legumes in the cropping system help increase organic matter content and maintain tilth.

Establishing and maintaining a mixture of grasses and legumes, the prevention of overgrazing, and providing artificial drainage are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, some of the desirable grasses and legumes die out, and grazing during periods of seasonal wetness cuts up and compacts the surface layer.

The soil is well suited to trees, and most of the acreage is wooded. The soil is managed mostly for pine and hardwoods. Seasonal wetness and flooding limit the use of timber equipment and are the main limitations for many urban uses. Capability subclass Vw.

34B—Sedgefield fine sandy loam, 2 to 7 percent slopes. This gently sloping, moderately well drained soil is on ridgetops and in broad areas. Slopes are smooth and commonly complex. Areas of this soil are commonly elongated or irregularly rectangular. They range from 5 acres to over 20 acres.

Typically, the surface layer is gray and light yellowish brown fine sandy loam about 11 inches thick. The subsoil is 34 inches thick. In sequence downward, it is 7 inches of olive yellow sandy clay loam; 9 inches of gray sandy clay; 14 inches of pale olive clay; and 4 inches of gray and mottled light gray, yellow, and greenish gray clay loam. The substratum is pale yellow loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Colfax, Forestdale, and Vance soils. The Colfax soils are commonly along upland drainageways or in depressional areas, and the Forestdale soils are nearly level. Included soils make up about 10 to 15 percent of this map unit.

The permeability of this soil is slow, and available water capacity is moderate. Runoff is medium. Tilth is good, and the soil is moderate in fertility and organic matter content. The subsoil has a high shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid or medium acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to cultivated crops and to pasture and hay, but alfalfa is short lived because of seasonal wetness. The hazard of erosion, the need for drainage, and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface maintains or increases organic matter content. The use of lime and fertilizer offsets the acidity and increases fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer and increases erosion.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed mostly for pine and hardwoods. The use of timber equipment is limited by wetness during winter and spring.

Slow permeability, seasonal wetness, and the high shrink-swell potential limit the soil for many urban uses. Capability subclass IIe.

34C—Sedgefield fine sandy loam, 7 to 15 percent slopes. This sloping, moderately well drained soil is on

ridgetops and side slopes. Slopes are smooth and commonly complex. Areas of this soil are generally long and winding. They range from 5 acres to over 10 acres.

Typically the surface layer is gray and light yellowish brown fine sandy loam about 11 inches thick. The subsoil is 34 inches thick. In sequence downward, it is 7 inches of olive yellow sandy clay loam; 9 inches of gray sandy clay; 14 inches of pale olive clay; and 4 inches of gray, reddish yellow, pale olive, firm, mottled clay loam. The substratum is pale yellow loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Colfax, Forestdale, and Wedowee soils. The Colfax and Forestdale soils are nearly level or are in depressional areas. Included soils make up about 10 to 15 percent of this map unit.

The permeability of this soil is slow, and available water capacity is moderate. Runoff is medium to rapid. Tilth is good, and the soil is moderate in fertility and organic matter content. The subsoil has a high shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid or medium acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. Some areas are farmed. Alfalfa is short lived because of seasonal wetness. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface helps maintain or increase organic matter content. The use of lime and fertilizer offsets the acidity and moderate fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer and increases erosion.

This soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed mostly for pine and hardwood. The use of timber equipment is limited by wetness during winter and spring.

Slow permeability, seasonal wetness, and the high shrink-swell potential limit the soil for many urban uses. Capability subclass IIIe.

35C2—Tallapoosa Variant fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on side slopes and ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 3 acres to over 10 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 2 inches thick. The subsoil is brown and red clay loam 13 inches thick. The substratum is reddish yellow loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Madison soil that has a thicker subsoil than this Tallapoosa Variant soil and that makes up about 10 percent of this map unit. Also included are small gullied areas and small severely eroded areas that make up about 5 percent of the unit.

The permeability of this soil is moderate to moderately rapid, and available water capacity is low to moderate. Runoff is medium to rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches, but root development is restricted in the substratum. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

Low available water capacity and the erosion hazard make this soil poorly suited to cultivated crops, but the soil is better suited to close-growing crops or to pasture and hay than to row crops. A main management concern is the need to increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion, and keeping crop residue on or near the surface helps increase or maintain organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods.

This soil is limited for many urban uses by slope. Capability subclass IVe.

35D2—Tallapoosa Variant fine sandy loam, 15 to 25 percent slopes, eroded. This moderately steep, well drained soil is on side slopes. Slopes are mainly smooth and commonly complex. Areas of this soil are generally long and winding. They range from 3 acres to over 10 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 2 inches thick. The subsoil is brown and red clay loam 13 inches thick. The substratum is reddish yellow loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Madison soil that makes up about 10 percent of this map unit. Also included are small gullied areas and severely eroded areas that make up about 5 percent of the unit.

The permeability of this soil is moderate to moderately rapid, and available water capacity is low to moderate. Runoff is rapid. The soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches, but root development is restricted in the substratum. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to pasture and hay. The soil is droughty during the growing season. The hazard of erosion, the need to increase organic matter content, establishing and maintaining a mixture of grasses and legumes, and the prevention of overgrazing are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, and deferment of grazing are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods. The use of timber equipment is limited by slope, and its use increases the hazard of erosion.

The soil is limited for most urban uses by slope. Erosion is a major concern at construction sites. Capability subclass VIe.

35E2—Tallapoosa Variant fine sandy loam, 25 to 50 percent slopes, eroded. This steep, well drained soil is on side slopes along drainageways. Slopes are mainly smooth and are commonly long and winding. Areas of this soil range from 3 acres to over 10 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 2 inches thick. The subsoil is mostly brown and red clay loam 13 inches thick. The substratum is reddish yellow loam to a depth of 60 inches or more.

Included with this soil in mapping are small gullied and severely eroded areas and areas of soils with a surface layer of sandy loam. These areas make up about 10 to 15 percent of the map unit.

The permeability of this soil is moderate to moderately rapid, and available water capacity is moderate. Runoff is rapid. The soil is low in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid. The hazard of erosion is severe.

This soil is poorly suited to pasture. The soil is droughty during the growing season. The hazard of erosion, maintaining a mixture of grasses and legumes, and the prevention of overgrazing are major management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, and deferment of grazing are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and most of the acreage is wooded. The soil is managed for pine and hardwoods. The use of timber equipment is restricted by slope, and its use increases the hazard of erosion. Slope also limits the soil for most urban uses. Capability subclass VIIe.

36B2—Tatum loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 4 to 150 acres.

Typically, the surface layer of this soil is yellowish brown loam about 4 inches thick. The subsoil is mostly red, friable silty clay loam and clay about 28 inches thick. The substratum extends to a depth of 60 inches or more. It is strongly weathered bedrock that crushes to silt loam.

Included with this soil in mapping are small, intermingled areas of Turbeville and Vance soils that make up about 10 to 15 percent of this map unit. The Vance soils occupy saddle positions, and the Turbeville soils are on low knolls. Also included, on the crest of ridges, are spots of gravelly soils and spots of severely eroded soils where the surface layer is yellowish red loam or silty clay loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 48 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is moderate.

The soil is well suited to cultivated crops and to pasture and hay, and some of the acreage is farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface maintains or increases organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and

the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed mostly for pine.

The moderate permeability and shrink-swell potential limit the soil for many urban purposes. Erosion is a major concern at construction sites. Capability subclass IIe.

36C2—Tatum loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 20 to 140 acres.

Typically, the surface layer of this soil is yellowish brown loam about 4 inches thick. The subsoil is mostly red, friable silty clay loam and clay about 28 inches thick. The substratum extends to a depth of 60 inches or more. It is strongly weathered schist that crushes to silt loam.

Included with this soil in mapping are small, intermingled areas of Turbeville and Vance soils that make up about 10 to 15 percent of this map unit. The Vance soils are on low saddle positions, and the Turbeville soils are on low knolls. Also included, on ridges and upper side slopes, are spots of gravelly soils and spots of severely eroded soils where the surface layer is yellowish red loam or silty clay loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium to rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 48 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. The hazard of erosion and the need to increase organic matter content are major concerns. Keeping crop residue on or near the surface helps maintain or increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed mostly for pine.

Slope and the moderate permeability and shrink-swell potential limit this soil for many urban uses. Erosion is a major concern at construction sites. Capability subclass IIIe.

36D2—Tatum loam, 15 to 25 percent slopes, eroded. This moderately steep, well drained soil is on side slopes along drainageways. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 5 to 60 acres.

Typically, the surface layer of this soil is yellowish brown loam about 4 inches thick. The subsoil is red, friable silty clay loam or clay 28 inches thick. The substratum extends to a depth of 60 inches or more. It is strongly weathered schist that crushes to silt loam.

Included with this soil in mapping are spots of gravelly soils, spots of severely eroded soils where the surface layer is yellowish red loam or clay loam, and small areas of soils that are 20 to 48 inches deep to bedrock. Included areas make up about 10 to 15 percent of this map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 48 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is poorly suited to cultivated crops, but is better suited to close-growing crops or to pasture and hay than to row crops. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion, and keeping crop residue on or near the surface maintains or increases organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed mostly for pine. Slope limits the use of timber equipment and is the main limitation of urban use. Capability subclass IVe.

37—Tuckahoe soils. These nearly level, well drained soils are on flood plains along the larger streams. Areas of these soils are elongated or irregularly rectangular. They range from 4 acres to over 20 acres.

Typically, the surface layer of these soils is dark brown loam about 10 inches thick. The surface layer, however, ranges from silt loam to fine sandy loam. The subsoil is 51 inches thick. It is brown loam and clay loam in the upper 20 inches and dark yellowish brown silty clay loam and brown loam in the lower 31 inches. The substratum is brown silt loam to a depth of 62 inches or more.

Included with this soil in mapping are small, intermingled areas of Buncombe, Monacan, and Pamunkey soils. The Buncombe soils are generally adjacent to the edge of the stream, the Monacan soils are in low lying areas, and the Pamunkey soils are on low rises or terraces. These soils make up about 10 to 15 percent of the map unit.

The permeability of these Tuckahoe soils is moderate, and available water capacity is high. Runoff is slow. Tilth is very good, and the soils are moderately high in fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and the subsoil are commonly strongly acid to neutral. The soils are commonly flooded for brief periods during the spring and early summer.

These soils are well suited to cultivated crops and to pasture and hay. Much of the acreage is farmed. Flooding is the major concern, but in most years it occurs early enough in the season that summer crops can be planted and harvested. The need to maintain the organic matter content, and the control of Johnson grass are management concerns. Minimum tillage, use of cover crops, keeping crop residue on or near the surface, and including grasses and legumes in the cropping system help to increase organic matter content and maintain tilth.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, some of the desirable grasses and legumes die out, and grazing during periods of wetness often cuts up and compacts the surface layer.

The soil is well suited to trees, and some of the acreage is wooded. The soil is managed mostly for hardwood species.

Flooding is the main limitation of the soil for urban uses. Capability subclass IIw.

38B2—Turbeville fine sandy loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 10 acres to over 25 acres.

Typically, the surface layer of this soil is yellowish brown fine sandy loam about 10 inches thick. The subsoil is mostly red, friable sandy clay and clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Bolling and Masada soils that make up about 10 to 15 percent of this map unit. The Bolling soils occupy areas around the head of drainageways. Also included on the crest of ridges are spots of severely eroded soils where the surface layer is yellowish red sandy clay loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is good, but the soil is low in fertility and organic matter content. The subsoil has moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to cultivated crops and to pasture and hay. Much of the acreage is farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface maintains or increases organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and some of the acreage is wooded. The soil is managed mostly for pine and hardwoods.

Moderate permeability, low strength, and the moderate shrink-swell potential limit the soil for many urban uses. Capability subclass IIe.

38C2—Turbeville fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 3 acres to over 20 acres.

Typically, the surface layer of this soil is yellowish brown fine sandy loam about 10 inches thick. The subsoil is mostly red, friable sandy clay and clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Bolling and Masada soils that make up about 10 to 15 percent of this map unit. The Bolling soils occupy areas around the head of drainageways. Also included are spots of severely

eroded soils where the surface layer is yellowish red sandy clay loam. These make up about 5 percent of this unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium to rapid. Tilth is good, but the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. Much of the acreage is farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface maintains or increases organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and some of the acreage is wooded. The soil is managed mostly for pine and hardwoods.

Moderate permeability, low strength, the moderate shrink-swell potential, and slope limit this soil for many urban uses. Erosion is a main concern at construction sites. Capability subclass IIIe.

39B3—Turbeville sandy clay loam, 2 to 7 percent slopes, severely eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly elongated. They range from 5 to 10 acres.

Typically, the surface layer of this soil is yellowish red sandy clay loam about 4 inches thick. The subsoil is mostly red, friable sandy clay and clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of gravelly soils and slightly eroded soils where the surface layer is yellowish brown fine sandy loam. These areas make up about 10 percent of the map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is poor, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. Much of the acreage is farmed. Erosion is a major limitation to the establishment of uniform seedings. A major management concern is the need to increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage helps reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed mostly for pine and hardwoods.

Moderate permeability, the moderate shrink-swell potential, and low strength limit the soil for many urban uses. Additions of topsoil help the establishment of lawns. Capability subclass IIIe.

39C3—Turbeville sandy clay loam, 7 to 15 percent slopes, severely eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are smooth and complex. Areas of this soil are commonly long and winding. They range from 5 acres to over 10 acres.

Typically, the surface layer of this soil is yellowish red sandy clay loam 4 inches thick. The subsoil is mostly red, friable sandy clay or clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Pacolet soil that make up about 10 percent of this map unit. Also included are spots of slightly eroded soils where the surface layer is fine sandy loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium to rapid. Tilth is poor, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil of this soil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is poorly suited to cultivated crops, but is better suited to close-growing crops or to pasture and hay than to row crops. Erosion is a major limitation to the establishment of uniform seedings. A major management concern is the need to increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce

runoff and control erosion, and keeping crop residue on or near the surface helps increase or maintain organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed mostly for pine and hardwoods.

Moderate permeability, low strength, and slope limit the soil for many urban uses. The addition of topsoil aids the establishment of lawns. Erosion is a major concern at construction sites. Capability subclass IVe.

41—Udorthents, mine spoil. This unit consists of piles of well drained to excessively drained soils made up of coal residue and soil material mixed with sandstone and shale fragments. The piles generally are irregular in shape and 5 to 10 feet high. They are adjacent to filled-in mine shafts and pits near Tuckahoe Creek in the eastern part of the county. The areas of this unit mainly range from 3 to 5 acres, but several are between 50 and 100 acres.

The surface layer of this material ranges from loam to gravelly sandy loam. The subsurface layers range from sandstone and shale fragments to gravelly loam.

Included with this unit in mapping are small areas of Creedmoor, Mayodan, and Pinkston soils that make up about 10 to 15 percent of the unit.

The permeability of this unit ranges from moderate to very rapid. Available water capacity is low, and runoff is slow to rapid. The organic matter content in the surface layer is moderate to low. The surface and subsurface layers are medium acid to extremely acid. The hazard of erosion is severe.

This unit is better suited to woodland than to most other uses. Stone fragments, low strength, and slope in some places limit the unit for most uses. Capability subclass not assigned.

42—Udorthents-Quarries complex. This complex consists of gravel- to boulder-size fragments mixed with sand and loamy sand (fig. 4). The areas are gently sloping to steep and generally range from 20 to 50 acres or more. Most of the areas are in quarries in the eastern part of the county.

Included with this complex in mapping are settling basins and topsoil stockpiles. Also included are small areas of Fluvanna, Georgeville, and Wedowee soils. These inclusions make up about 15 percent of this map unit.

The physical properties of the Udorthents part of this complex are highly variable. Generally, permeability is rapid to very rapid and available water capacity is low. Reaction is strongly acid to very strongly acid.

Onsite investigation is generally needed to determine the use and management of this complex. Capability subclass not assigned.

43B—Vance fine sandy loam, 2 to 7 percent slopes. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly elongated. They range from 4 acres to over 15 acres.

Typically, the surface layer of this soil is light yellowish brown fine sandy loam about 7 inches thick. The subsurface layer is yellowish brown fine sandy loam 6 inches thick. The subsoil is 32 inches thick. It is mostly strong brown clay loam, yellowish brown clay, strong brown clay, and mottled yellowish brown and red clay. The substratum is red clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Colfax and Sedgefield soils that make up about 10 to 15 percent of this map unit. Both soils occupy depressions and areas around the head of drainageways.

The permeability of this soil is slow, and available water capacity is moderate. Runoff is medium. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone generally extends to a depth of about 60 inches, but the very firm clayey subsoil restricts root growth. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. Some of the acreage is farmed. The erosion hazard and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface helps to maintain or increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods.

Slow permeability, the moderate shrink-swell potential, and the low strength of the subsoil limit the soil for many urban uses. Capability subclass IIIe.

43C2—Vance fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 4 acres to over 15 acres.

Typically, the surface layer of this soil is light yellowish brown fine sandy loam about 5 inches thick. The subsoil is 32 inches thick. It is mostly strong brown clay loam, yellowish brown clay, strong brown clay, and mottled yellowish brown and red clay. The substratum is red clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Appling, Wedowee, Colfax, and Sedgefield soils that make up about 10 to 15 percent of this map unit. The Colfax and Sedgefield soils are in depressional areas. Also included, on the crest of ridges and on upper side slopes, are spots of severely eroded soils where the surface layer is yellowish brown clay loam. These make up about 5 percent of the unit.

The permeability of this soil is slow, and available water capacity is moderate. Runoff is medium to rapid. Tilth is fair, and the soil is low in fertility and organic matter. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches, but root growth is restricted by the firm subsoil. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is mostly poorly suited to cultivated crops, but is moderately well suited to close-growing crops and to pasture and hay. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion, and keeping crop residue on or near the surface helps maintain or increase organic content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. It is managed mostly for pine and hardwoods.

Slow permeability, the moderate shrink-swell potential, the low strength of the subsoil, and slope limit the soil for many urban uses. Capability subclass IVe.

44B2—Wedowee fine sandy loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 4 acres to over 20 acres.

Typically, the surface layer of this soil is mostly yellowish brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish red, friable to firm clay and sandy clay 32 inches thick. The substratum is reddish yellow clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Colfax, Sedgefield, and Vance soils that make up about 10 to 15 percent of this map unit. These soils are around the head of drainageways and on smooth drainage divides. Also included are spots of gravelly soils and soils that have a surface layer of clay loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil is well suited to cultivated crops and to pasture and hay. Some of the acreage is farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. Keeping crop residue on or near the surface maintains or increases organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and some of the acreage is wooded. The soil is managed for pine and hardwoods.

The moderate permeability and shrink-swell potential limit the soil for many urban uses. Capability subclass IIe.

44C2—Wedowee fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 5 acres to over 35 acres.

Typically, the surface layer of this soil is mostly yellowish brown fine sandy loam about 5 inches thick.

The subsoil is mostly yellowish red, friable clay and sandy clay 32 inches thick. The substratum is reddish yellow clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Colfax, Sedgefield, and Vance soils that make up about 10 to 15 percent of this map unit. Also included, on the crest of ridges and on upper side slopes, are spots of severely eroded soils where the surface layer is clay loam and spots of soils where the surface layer is gravelly sandy loam. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium to rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. Some of the acreage is farmed. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and some of the acreage is wooded. The soil is managed for pine and hardwoods.

The moderate permeability and moderate shrink-swell potential and slope limit the soil for many urban uses. Erosion is a major concern on construction sites. Capability subclass IIIe.

44D2—Wedowee fine sandy loam, 15 to 25 percent slopes, eroded. This moderately steep, well drained soil is on side slopes. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 4 acres to over 30 acres.

Typically, the surface layer of this soil is mostly yellowish brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish red, friable clay and sandy clay 32 inches thick. The substratum is reddish yellow and yellowish red clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Louisburg soil that is generally on the steepest part of the landscape. Also included are spots of soils that have a gravelly surface layer or a surface layer of clay loam. Included soils make up about 10 to 15 percent of the map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is poorly suited to cultivated crops, but is better suited to close-growing crops or to pasture and hay than to row crops. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion, and keeping crop residue on or near the surface helps maintain or increase organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed for pine and hardwoods. Slope limits the use of timber equipment and is the main limitation for many urban uses. Capability subclass IVe.

45B3—Wedowee clay loam, 2 to 7 percent slopes, severely eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 4 to 20 acres.

Typically, the surface layer of this soil is yellowish red clay loam about 4 inches thick. The subsoil is mostly yellowish red, friable clay 28 inches thick. The substratum is reddish yellow clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Colfax, Sedgefield, and Vance soils that make up about 10 to 15 percent of this map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium. Tilth is poor, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very

strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed mostly for pine, but the use of timber equipment is limited by the sticky surface texture, and its use increases the hazard of erosion.

The moderate permeability and shrink-swell potential limit the soil for many urban uses. Additions of topsoil help the establishment of lawns. Capability subclass IIIe.

45C3—Wedowee clay loam, 7 to 15 percent slopes, severely eroded. This sloping, well drained soil is on ridgetops and side slopes. Slopes are generally smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 5 to 15 acres.

Typically, the surface layer of this soil is yellowish red clay loam about 4 inches thick. The subsoil is mostly yellowish red, friable clay 28 inches thick. The substratum is reddish yellow clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Colfax, Sedgefield, and Vance soils that make up the less sloping parts of the unit. They make up about 10 to 15 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is medium to rapid. Tilth is poor, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil is poorly suited to cultivated crops, but it is better suited to close-growing crops and pasture and hay than to row crops. The hazard of erosion and the need to increase organic matter content are major management concerns. The use of lime and fertilizer offsets the acidity and low fertility of the soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and much of the acreage is wooded. This soil is managed mostly for pine, but the use of timber equipment is limited by the sticky surface layer, and its use increases the hazard of erosion.

The moderate permeability and shrink-swell potential and slope limit the soil for many urban uses. Erosion is a major concern at construction sites. Capability subclass IVe.

45D3—Wedowee clay loam, 15 to 25 percent slopes, severely eroded. This moderately steep, well drained soil is on side slopes along drainageways. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 5 to 20 acres.

Typically, the surface layer of this soil is yellowish red clay loam about 4 inches thick. The subsoil is mostly yellowish red, friable clay 23 inches thick. The substratum is reddish yellow clay loam and loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Louisburg soil mainly on the steepest part of the landscape or along slope breaks. Also included are small areas of rock outcrop, small gullied areas, and small areas of soils with a gravelly surface layer. Included areas make up about 10 to 15 percent of this map unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is rapid. The soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is severe.

The hazard of erosion and slope make this soil unsuitable for cultivated crops; the soil is, however, moderately well suited to pasture and hay. A major management concern is the need to increase organic matter content. The use of lime and fertilizer offsets the acidity and low fertility of the soil. Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, and deferment of grazing are useful pasture

management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and much of the acreage is wooded. The soil is managed mostly for pine.

Slope is the main limitation for urban uses. Capability subclass VIe.

46—Wehadkee silt loam. This nearly level, poorly drained soil is on flood plains along streams and large drainageways. Areas of this soil are commonly elongated. They range from 4 acres to over 25 acres.

Typically, the surface layer is grayish brown silt loam about 9 inches thick. The subsoil is mostly friable, gray loam 21 inches thick. The substratum is gray loamy sand and sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Fork Variant and Monacan soils that make up about 10 to 15 parcent of this map unit. These soils are on higher, better drained areas than Wehadkee soils. Also included are spots of sandy soils, gravelly soils, and very poorly drained soils. These make up about 5 percent of the unit.

The permeability of this soil is moderate, and available water capacity is moderate. Runoff is slow. Tilth is fair, and the soil is low in fertility and moderate in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are medium acid to neutral. This soil is frequently flooded for brief periods during winter, spring, and early summer.

Flooding limits this soil for cultivation, and artificial drainage is needed to make the soil suitable for crops. The soil is moderately well suited to pasture. Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer and artificial drainage are useful pasture management practices. If the pasture is overgrazed, some of the desirable grasses and legumes die out. Grazing during periods of seasonal wetness cuts up and compacts the surface layer.

The soil is well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods. Seasonal wetness and flooding are the major management concerns.

The seasonal high water table during winter and spring, and flooding limit the soil for many urban uses. Capability subclass VIw.

47B2—Wilkes fine sandy loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and narrow. They range from 3 to 10 acres.

Typically, the surface layer of this soil is dark brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish brown, friable clay loam 10 inches thick. The substratum is strong brown loam 5 inches thick. Strongly weathered bedrock is between depths of 20 and 35 inches, and hard bedrock is at a depth of 35 inches.

Included with this soil in mapping are small, intermingled areas of Enon and Wedowee soils that make up about 10 to 15 percent of this map unit.

The permeability of this soil is moderately slow, and available water capacity is low. Runoff is medium. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 20 to 35 inches. The surface layer and subsoil are generally medium acid to neutral. Hard bedrock is commonly at a depth of 20 to 48 inches. The hazard of erosion is severe.

This soil is moderately well suited to cultivated crops and to pasture and hay. Low available water capacity, the hazard of erosion, and the need to increase organic matter content are major management concerns. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion, and keeping crop residue on or near the surface maintains or increases organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods.

Hard bedrock at a depth of 20 to 48 inches limits the soil for many urban uses. Capability subclass IIIe.

47C2—Wilkes fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on side slopes and ridgetops. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 5 acres to over 20 acres.

Typically, the surface layer of this soil is dark brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish brown, friable clay loam 10 inches thick. The substratum is strong brown loam 5 inches thick. Strongly weathered bedrock is between depths of 20 and 35 inches, and hard bedrock is at a depth of 35 inches.

Included with this soil in mapping are small, intermingled areas of Enon and Wedowee soils that make up about 10 to 15 percent of this map unit.

The permeability of this soil is moderately slow, and available water capacity is low. Runoff is medium to rapid. Tilth is fair, and the soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 20 to 35 inches. The surface layer and subsoil are commonly medium acid to neutral. Hard bedrock is commonly at a depth of 20 to 48 inches. The hazard of erosion is severe.

Drought during the growing season and erosion make this soil poorly suited to cultivated crops, but the soil is better suited to close-growing crops or to pasture and hay than to row crops. A main management concern is the need to increase organic matter content. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion, and keeping crop residue on or near the surface helps maintain or increase organic matter content.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods.

The shallow depth to bedrock limits the soil for many urban uses. Capability subclass IVe.

47D2—Wilkes fine sandy loam, 15 to 25 percent slopes, eroded. This moderately steep, well drained soil is on side slopes. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 3 acres to over 15 acres.

Typically, the surface layer of this soil is dark brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish brown, friable clay loam 10 inches thick. The substratum is strong brown loam 5 inches thick. Strongly weathered bedrock is between depths of 20 and 35 inches, and hard bedrock is at a depth of 35 inches.

Included with this soil in mapping are small areas of Wedowee soil. Also included are small areas of soils that are less than 20 inches deep to hard bedrock. Included soils make up about 10 to 15 percent of this map unit.

The permeability of this soil is moderately slow, and available water capacity is low. Runoff is rapid. The soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 20 to 35 inches. The surface layer and subsoil are commonly medium acid to neutral unless lime has been applied. Hard bedrock is commonly at a depth of 20 to 40 inches. The hazard of erosion is severe.

This soil is moderately well suited to pasture and hay. Drought during the growing season and the hazard of erosion are the main limitations. The need to increase organic matter content, establishing and maintaining a mixture of grasses and legumes, and the prevention of overgrazing are major pasture management concerns. The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for pine and hardwoods. Slope limits the use of timber equipment and is the main limitation for urban uses. Capability subclass VIe.

47E2—Wilkes fine sandy loam, 25 to 45 percent slopes, eroded. This steep, well drained soil is on side slopes along drainageways. Slopes are smooth and commonly complex. Areas of this soil are commonly long and winding. They range from 3 acres to over 15 acres.

Typically, the surface layer of this soil is dark brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish brown clay loam 10 inches thick. The substratum is strong brown loam 5 inches thick. Strongly weathered bedrock is at a depth of 20 inches, and hard bedrock is at a depth of 35 inches.

Included with this soil in mapping are small, intermingled areas of Louisburg and Wedowee soils that make up about 10 to 15 percent of this map unit. Also included are small areas of soils that are less than 20 inches deep to hard bedrock. They make up about 5 percent of the unit.

The permeability of this soil is moderately slow, and available water capacity is low. Runoff is rapid. The soil is low in fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 20 to 40 inches. The surface layer and subsoil are commonly medium acid to neutral. Hard bedrock is commonly at a depth of 20 to 40 inches. The hazard of erosion is severe.

This soil is poorly suited to pasture. Drought during the growing season and the hazard of erosion are the main limitations. Maintaining a mixture of grasses and legumes and the prevention of overgrazing are major management concerns.

The use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, and deferment of grazing are useful pasture management practices. If the pasture is overgrazed, runoff and erosion increase.

This soil is moderately well suited to trees, and most of the acreage is wooded. The soil is managed for pine and hardwoods. Slope limits the use of timber equipment

and is the main limitation for urban uses. Capability subclass VIIe.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, for woodland, as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities, and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

The major management concerns in the use of the soils for crops and pasture are described in this section. The system of land capability classification used by the Soil Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil or that a given crop is not commonly irrigated.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely

to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management (*4*). Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forest trees or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. The capability classes and subclasses are defined in the following paragraphs. A survey area may not have soils of all classes. Capability units are not used in Goochland County.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability subclass is identified in the description of each soil map unit in the section "Soil maps for detailed planning."

Woodland management and productivity

Luitpold W. Kempf, woodland conservationist, Soil Conservation Service, assisted in preparing this section.

Goochland County has about 122,720 acres of woodland. Most of this is second-growth hardwoods, loblolly pine, and Virginia pine.

The original trees in the county consisted of mainly mixed stands of Chestnut oak, white oak, post oak, scarlet oak, black oak, northern red oak, southern red oak, and hickory. Yellow-poplar was on the more moist sites. Shortleaf pine and Virginia pine were scattered throughout these hardwood stands. The poorly drained areas were covered by mixed stands of green ash, sweetgum, blackgum, boxelder, and red maple.

Most of the original woodland was cleared and the soils were cultivated as the land was settled and consolidated into farm holdings. Gradually, as the soils became eroded and fertility became depleted, the soils were allowed to return to woodland. The present stands of mixed hardwoods, Virginia pine, and loblolly pine are mostly on abandoned farmland.

Table 6 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Map unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate;

and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: w, d, c, s, and r.

In table 6 the soils are also rated for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of major soil limitations.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings. Plant competition is not considered in the ratings. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Considered in the ratings of *windthrow hazard* are characteristics of the soil that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that trees in wooded areas are not expected to be blown down by commonly occurring winds; *moderate*, that some trees are blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. Site index is listed for trees that woodland managers generally favor for wood crop production because of growth rate, quality, value, and marketability. Other tree species that commonly occur on the soil are also listed, regardless of potential value or growth.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

Engineering

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses (*3*).

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a

similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 7 shows, for each kind of soil, the degree and kind of limitations for building site development; table 8, for sanitary facilities; and table 10, for water management. Table 9 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping are indicated in table 7. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil layers, or horizons, below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 7 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 7 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, and shrink-swell potential are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Lawns and landscaping require soils that are suitable for the establishment and maintenance of turf for lawns and ornamental trees and shrubs for landscaping. The best soils are firm after rains, are not dusty when dry, and absorb water readily and hold sufficient moisture for plant growth. The surface layer should be free of stones. If shaping is required, the soils should be thick enough over bedrock or hardpan to allow for necessary grading. In rating the soils, the availability of water for sprinkling is assumed.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 8 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 8 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the layers, the surface layer in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the original surface layer for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils

surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 9 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the surface and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have layers of contrasting suitability within their profile. The estimated engineering properties in table 13 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 9 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 13.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel or stones.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel or stones; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 10, soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and

organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 10 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; and availability of outlets for drainage.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

The soils of the survey area are rated in table 11 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 11 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 8, and interpretations for dwellings without basements and for local roads and streets, given in table 7.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They should have a surface that is free of stones and boulders and have moderate slopes. Suitability of the soil for traps, tees, or greens was not considered in rating the soils. Irrigation is an assumed management practice.

Wildlife habitat

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they

affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 12, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of native plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, and cordgrass and rushes, sedges, and reeds.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail rabbit, and red fox.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features and data obtained from physical and chemical laboratory analyses of soils.

Engineering properties

Table 13 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 13 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 13 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified soil classification system (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The estimated classification, without group index numbers, is given in table 13. Also in table 13 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard)

is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

Physical and chemical properties

Table 14 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 15 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly

impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Formation of the soils

Soils are formed through the interaction of five major factors: climate, plant and animal life, parent material, topography, and time. The relative influence of each factor usually varies from place to place. Variations in the soils of Goochland County are mainly caused by differences in kind of parent material, in topography, and in drainage. In some places one factor may dominate the formation of a soil and determine most of its properties.

Climate

The climate of Goochland County is characteristic of a humid-continental type that is marked by extreme seasonal temperature changes. The county has an average annual air temperature of about 55 degrees F. This warm temperature has limited the accumulation of organic matter in the surface layer of the soils. For more detailed information on climate, see the section under "General nature of the county."

Plant and animal life

The living organisms that affect soil formation include vegetation, animals, bacteria, and fungi. The vegetation is generally responsible for the amount of organic matter, color of the surface layer, and the amount of nutrients. Earthworms, cicadas, and burrowing animals help keep the soil open and porous. Bacteria and fungi decompose the vegetation, thus releasing nutrients for plant food. In Goochland County, the native forests have had more influence on soil formation than any other living organism. Man, however, has greatly influenced the surface layer where he has cleared the forests and plowed the land. He has added plant nutrients, has mixed some of the soil layers, and has moved soil materials from place to place.

Parent material

Parent material is the unconsolidated mass from which the soils are formed. It determines the mineralogical and chemical composition of the soil and, to a large extent, the rate at which soil-forming processes take place.

In Goochland County, soils have formed in the residuum of granite, basic rock, and sandstone and shale and in alluvium. Alluvial material is commonly of recent origin and is currently being deposited. Soils formed in stream bottoms in alluvium are commonly medium textured and have little soil development. Monacan, Tuckahoe, and Wehadkee soils are examples. Soils formed in residuum from granite are the most extensive in the county and have a wide range of characteristics, the most common of which is a red or yellowish red, clayey subsoil. Appling, Cecil, Madison, Pacolet, and Wedowee soils are examples of soils formed in the residuum of granite and related rock. Sedgefield and Vance soils, for example, formed in the residuum of mixed granite and basic rock. Soils formed in the residuum of basic rock, such as Enon, Orange, and Wilkes soils, commonly have a plastic, clayey subsoil. Soils formed in the residuum of sandstone and shale, for example, Creedmoor and Mayodan soils, also have a plastic, clayey subsoil.

Topography

Goochland County is in the eastern Piedmont physiographic province and is within the James River drainage system. In places, the area is dissected to depths of more than 100 feet. The elevation in the county changes at an average rate of about 100 feet per mile. The rate of change is greater near the James River and its major tributaries. The average elevation of the county is about 300 feet above sea level.

The shape of the land surface, the slope, and the position in relation to the water table have influenced the formation of soils in the county. Also, the permeability of the soil material and the length, steepness, and configuration of the slopes influence the kind of soil that is formed from place to place. Soils formed on sloping areas, where runoff is moderate to rapid, generally are well drained, have a bright-colored subsoil with few mottles, and in most places are leached to a greater depth than the wetter soils in the same general area. In more gently sloping areas, where runoff is slower, the soils generally exhibit some evidence of wetness for short periods of time, such as mottling in the subsoil. In level areas or in slight depressions where the water table is at or near the surface for long periods, the soils show a marked degree of wetness. Such soils have a thick, dark-colored surface layer and a strongly mottled or grayish subsoil.

Time

The formation of soils requires time for changes to take place in the parent material. Some of the soils of Goochland County, for example, Cecil soils, have developed over a period of as much as several million years. Soils of this age are on broad summits. Most of the soils in the county are much younger, however, because erosion is constantly removing the surface. At the same time erosion is taking place, soil development is adding new material. When the soil removed equals the new soil formed, the soil is said to be in equilibrium and to have a constant age. It has been estimated that it takes 1,000 years for 1 inch of soil to develop. The average soil depth in Goochland County is 40 inches, indicating an effective age of 40,000 years.

Soils formed on low bottoms, which are subject to varying degrees of flooding, may receive new sediments with each flooding. These soils, such as Tuckahoe soils, have weak structure and weak color differences between layers.

Processes of soil horizon differentiation

Several processes are involved in the formation of soil layers, or horizons, in the soils of Goochland County. These include the accumulation of organic matter, the leaching of soluble salts, the reduction and translocation of iron, the formation of soil structure, and the translocation and loss of clay minerals, aluminum, silica, and iron. These processes are continually taking place throughout the soil and are measured in thousands of years.

The accumulation of organic matter takes place during the decomposition of plant residue. This process darkens the surface layer and helps form the surface layer, or A1 horizon. Once organic matter has been lost, it takes a long time to replace. The surface layer of the soils of Goochland County has an average organic matter content of about 1.5 percent.

The soils in Goochland County have a distinct subsoil. It is believed that some of the lime and other soluble salts are leached before translocation of iron and clay takes place. Many factors affect this leaching, such as kinds of salts originally present, the depth to which the soil solution percolates, and the texture of the soil.

Well drained and moderately well drained soils in Goochland County have a yellowish brown or reddish susboil. These colors are mainly caused by thin coatings of iron oxides on sand and silt grains, although in some soils the colors are inherited from the rock in which the soils developed. Development of blocky structure has taken place in the well drained and moderately well drained soils, and the subsoil contains more clay than the overlying surface layer.

The reduction and transfer of iron, called gleying, takes place mainly in the wetter, more poorly drained

soils. Poorly drained soils, such as the Roanoke and Forestdale soils, have a grayish subsoil and underlying material, indicating reduction and transfer of iron. Moderately well drained to somewhat poorly drained soils, for example, Fork Variant, Monacan, and Creedmoor soils, have yellowish brown, reddish brown, and gray mottles, indicating the segregation of iron.

A firm, brittle layer, called a fragipan, developed in the subsoil of some moderately well drained and somewhat poorly drained soils. The soil particles in this layer are tightly packed so that bulk density is high and pore space is low. Genesis of this layer is not fully understood, but studies show that swelling and shrinking takes place in alternating wet and dry periods, which may account for the tight packing of soil particles and the gross polygonal pattern of cracks in the fragipan. Clay, silica, and oxides of aluminum are the most likely cementing agents causing brittleness and hardness. An example of soils with a fragipan is Colfax soils.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*5*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Appling series

The Appling series consists of deep, well drained soils that formed in the weathered products of granite and granite gneiss. The soils are on ridgetops in the Piedmont province. Slopes are 2 to 7 percent.

Appling soils are commonly near Colfax, Louisburg, and Vance soils. Colfax soils are not as well drained as Appling soils and have a fragipan that is not typical in the Appling soils. Louisburg soils have less clay in the subsoil and a thinner solum than Appling soils, and Vance soils have a firmer subsoil.

Typical pedon of Appling fine sandy loam, 2 to 7 percent slopes, in a wooded area 1 mile northeast of Manakin, 50 feet south of Highway 668, between Highways 621 and 623:

O1—2 inches to 0, dark gray (10YR 4/1) partly decomposed leaves and twigs; many fine roots.

A1—0 to 3 inches, yellowish brown (10YR 5/4) fine sandy loam; moderate fine granular structure; very friable, nonsticky, nonplastic; many fine pores; 8 percent rounded quartz pebbles up to 2 inches in diameter; few fine mica flakes; strongly acid; clear wavy boundary.

A2—3 to 9 inches, light yellowish brown (10YR 6/4) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; many fine pores; 5 percent rounded quartz pebbles up to 2 inches in diameter; few fine mica flakes; strongly acid; clear wavy boundary.

B1—9 to 13 inches, reddish yellow (7.5YR 6/6) sandy clay loam; few fine faint reddish brown (5YR 5/4) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; few fine pores; few thin strong brown (7.5YR 5/6) clay films; 2 percent rounded quartz pebbles up to 1 inch in diameter; few fine mica flakes; very strongly acid; clear wavy boundary.

B2t—13 to 32 inches, yellowish red (5YR 5/6) clay; common coarse distinct red (2.5YR 4/8) and few medium prominent brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; firm, sticky, plastic; few fine roots; few fine pores; thin continuous reddish brown (5YR 5/4) clay films; few fine flakes of mica; very strongly acid; gradual wavy boundary.

B3t—32 to 48 inches, mottled yellowish red (5YR 5/6), red (2.5YR 4/8), and brownish yellow (10YR 6/8) heavy clay loam; weak fine subangular blocky structure; friable, sticky, plastic; few fine roots; thin patchy reddish brown (5YR 5/4) clay films; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C—48 to 63 inches, mottled red (2.5YR 5/8) and brownish yellow (10YR 6/8) sandy clay loam; massive; friable, slightly sticky, nonplastic; common yellowish red (5YR 4/6) clay flows; few pockets of red (2.5YR 4/8) and yellowish red (5YR 4/6) clay; few fine flakes of mica; very strongly acid.

The solum thickness is 40 to 56 inches. Depth to bedrock is more than 60 inches. Rounded pebbles of quartz and quartzite up to 2 inches in diameter make up 2 to 10 percent of the A and B horizons. The A horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The Bt horizon has hue of 5YR to 10YR, value of 5 and 6, and chroma of 6 to 8. The Bt horizon is clay, clay loam, and sandy clay. The C horizon is sandy loam and sandy clay loam.

Bolling series

The Bolling series consists of deep, moderately well drained soils that formed in alluvial sediments derived mostly from mixed basic and acidic rocks of the Piedmont plateau. The soils are on low terraces along the James River and its tributaties. Slopes range from 0 to 7 percent.

Bolling soils are commonly near the Pamunkey, Fork Variant, and Roanoke soils. Fork Variant and Roanoke soils are not as well drained as Bolling soils, and the Pamunkey soils are better drained.

Typical pedon of Bolling silt loam in an area of Bolling soils, 0 to 2 percent slopes, 25 feet west of Highway 643 and 800 feet north of the James River, at Westview Public Landing:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable, nonsticky, slightly plastic; many fine roots; common fine pores; few fine flakes of mica; slightly acid; clear smooth boundary.

B1—7 to 11 inches; dark brown (10YR 4/3) heavy silt loam; few fine distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable, slightly sticky, plastic; few fine roots; common fine pores; common fine flakes of mica; slightly acid; clear wavy boundary.

B21t—11 to 35 inches; pale brown (10YR 6/3) clay loam; common fine distinct strong brown (7.5YR 5/8) and grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; friable, plastic, sticky; few fine roots and pores; thin patchy dark yellowish brown (10YR 4/4) clay films; few fine flakes of mica; few fine dark colored oxide stains; slightly acid; clear wavy boundary.

B22t—35 to 63 inches; grayish brown (10YR 4/2) clay loam; common medium distinct strong brown (7.5YR 5/6) and dark yellowish brown (10YR 4/4) mottles; moderate fine and medium subangular blocky structure; friable, plastic, sticky; few fine roots and pores; thin patchy grayish brown (10YR 5/2) clay films; few fine flakes of mica; common fine dark colored oxide stains and concretions; slightly acid.

The solum thickness ranges from 30 to 60 inches or more. Depth to hard rock is greater than 5 feet. Coarse fragments make up 0 to 15 percent of the A horizon and 0 to 5 percent of the B horizon. The soil commonly ranges from medium acid to neutral in the lower part of the B horizon, and from very strongly acid to neutral in the upper part of the profile. Few to common flakes of mica are throughout the solum in most pedons.

The A1 or Ap horizon has hue of 7.5YR through 2.5Y, value of 4 to 6, and chroma of 2 to 4. The A2 horizon, where present, has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. The A horizon is silt loam, loam, or fine sandy loam.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of mainly 3 to 8. The lower part of the Bt horizon has chroma of 2 or less. The B horizon has mottles with hue of 7.5YR to 5Y and N, value of 4 to 7, and chroma of 0 to 8. Th B2t horizon commonly is silty clay loam to sandy clay loam. Some pedons have silty clay or clay in the lower part of the B2t horizon.

The B3 horizon, where present, is typically the same color and texture as the B2t horizon, and it is sandy loam, loam, or silt loam. Some pedons have a matrix with chroma of 2 or less.

The C horizon, where present, is commonly stratified. Individual strata range from sand or gravel to clay.

Bourne series

The Bourne series consists of deep, moderately well drained soils that have a fragipan. The soils formed in Coastal Plain sediments that overlie Triassic rock in the eastern part of the county. Slopes range from 2 to 7 percent.

Bourne soils are commonly near Mayodan, Credmoor, and Masada soils. None of these soils has a fragipan typical of the Bourne soils.

Typical pedon of Bourne fine sandy loam, 2 to 7 percent slopes, in a wooded area 0.6 mile northeast of the intersection of Highways 650 and 649:

O1—2 inches to 1 inch, pine needles and leaves.

O2—1 inch to 0, black (10YR 2/1) partially decomposed organic matter.

A1—0 to 6 inches, light yellowish brown (2.5Y 6/4) fine sandy loam; weak very fine granular structure; very friable, nonsticky, nonplastic; common fine and medium roots; vey strongly acid; clear smooth boundary.

A2—6 to 12 inches, light yellowish brown (2.5Y 6/4) fine sandy loam; weak medium subangular blocky structure parting to weak fine granular; soft, friable, nonsticky, nonplastic; few fine and medium roots; very strongly acid; clear smooth boundary.

B1—12 to 18 inches, light yellowish brown (10YR 6/4) sandy clay loam; few fine faint yellowish brown mottles; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, nonplastic; few fine roots; few rounded quartz pebbles up to 2 inches in diameter; very strongly acid; clear smooth boundary.

B2t—18 to 28 inches, strong brown (7.5YR 5/6) clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few fine roots; thin continuous strong brown (7.5YR 5/6) clay films; 10 percent rounded quartz

pebbles up to 2 inches in diameter; very strongly acid; clear wavy boundary.

Bx1—28 to 35 inches, yellowish brown (10YR 5/6) loam; many medium and coarse distinct very pale brown (10YR 7/3) mottles and few medium distinct light gray (10YR 7/2) mottles; moderate very thick platy structure; very hard, brittle, nonsticky, nonplastic; few fine roots; thin continuous strong brown (7.5YR 5/6) clay films on vertical and horizontal ped faces and in pores and channels; 15 percent rounded quartz pebbles up to 4 inches in diameter; common fine vesicular pores; very strongly acid; clear wavy boundary.

Bx2—35 to 52 inches, yellowish red (5YR 5/6) sandy clay loam; many medium and coarse distinct red (2.5YR 4/6), very pale brown (10YR 7/3), and strong brown (7.5YR 5/8) mottles; moderate very thick platy structure; very hard, brittle, slightly sticky, slightly plastic; thin continuous clay films; 10 percent rounded quartz pebbles up to 2 inches in diameter; very strongly acid; clear irregular boundary.

C—52 to 82 inches, dark red (2.5YR 3/6), brownish yellow (10YR 6/6), and light gray (10YR 7/2) clay loam; massive; firm, partially brittle, slightly sticky, slightly plastic; few rounded quartz pebbles up to 1 inch in diameter; very strongly acid.

The solum thickness ranges from 40 to 60 inches. Depth to hard rock is more than 60 inches. Pebbles make up 0 to 20 percent of the B horizon and up to 5 percent of the C horizon. Cobbles make up 0 to 3 percent of the B horizon. Reaction is strongly acid or very strongly acid throughout the profile unless limed. Depth to the top of the fragipan ranges from 18 to 36 inches.

The A horizon has hue of 10YR and 2.5Y, value of 4 to 6, and chroma of 2 to 4.

The Bt horizon is yellowish brown and strong brown and has hue of 10YR and 7.5YR, value of 5, and chroma of 6 or 8. The Bt horizon ranges from sandy clay loam to loam.

The Bx horizon is mottled with colors having hue of 2.5YR to 2.5Y, value of 4 to 7, and chroma of 2 to 8. The texture of the Bx horizon includes clay loam.

The texture of the C horizon includes very fine sandy loam.

Buncombe series

The Buncombe series consists of deep, excessively drained, sandy soils that formed in sandy alluvial sediments. Slopes range from 0 to 2 percent.

Buncombe soils are commonly near Tuckahoe and Monacan soils. Tuckahoe soils are not as sandy as Buncombe soils, and Monacan soils are not as well drained.

Typical pedon of Buncombe loamy fine sand, in a field 1 mile west of Pemberton and 400 feet south of the C&O Railroad:

Ap—0 to 7 inches, dark brown (10YR 4/3) loamy fine sand; weak fine granular structure; loose; many fine roots; few fine flakes of mica; medium acid; abrupt smooth boundary.

C1—7 to 16 inches, very pale brown (10YR 7/4) loamy fine sand; single grain; loose; few fine roots; few fine flakes of mica; medium acid; clear wavy boundary.

C2—16 to 26 inches, light yellowish brown (10YR 6/4) loamy fine sand; single grain; loose; few fine roots; few fine flakes of mica; strongly acid; abrupt smooth boundary.

C3—26 to 42 inches, yellowish brown (10YR 5/4) loamy fine sand; single grain; loose; few fine roots; few fine flakes of mica; strongly acid; gradual smooth boundary.

C4—42 to 65 inches, brownish yellow (10YR 6/6) loamy fine sand; single grain; loose; few fine roots; few fine flakes of mica; very strongly acid.

Depth to hard rock is more than 60 inches. The reaction in the profile is very strongly acid to medium acid. The C horizon has value of 4 to 7 and chroma of 3 to 6.

Cecil series

The Cecil series consists of deep, well drained soils that formed in material weathered from acid igneous and metamorphic rock. The soils are on broad, generally complex ridges. Slopes range from 2 to 15 percent.

Cecil soils are commonly near Madison, Wedowee, and Vance soils. Madison soils have a higher mica content in the Bt horizon than Cecil soils, Wedowee soils have a thinner solum and less red in the Bt horizon, and Vance soils have a firmer and more plastic Bt horizon.

Typical pedon of Cecil fine sandy loam, 2 to 7 percent slopes, eroded, 0.4 mile southeast of the intersection of Highways 632 and 634 and 0.2 mile south of Highway 632, in a cultivated field:

Ap—0 to 9 inches, brown (10YR 5/3) fine sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine roots; 5 percent quartzite pebbles up to 1.5 inches in diameter; strongly acid; abrupt smooth boundary.

B21t—9 to 16 inches, red (2.5YR 5/6) light clay; weak fine and medium subangular blocky structure; firm, plastic, sticky; common fine roots; thin continuous reddish brown (5YR 5/4) clay films; few fine mica flakes; 2 percent quartzite pebbles up to 0.5 inch in diameter; strongly acid; clear smooth boundary.

B22t—16 to 28 inches, red (2.5YR 4/8) clay; moderate fine and medium subangular blocky structure; firm,

plastic, sticky; common fine roots; thin continuous red (2.5YR 4/6) clay films; common fine mica flakes; 1 percent quartzite pebbles 0.06 to 1 inch in diameter; strongly acid; clear smooth boundary.

B23t—28 to 40 inches, red (2.5YR 4/8) clay; few fine and medium prominent light yellowish brown (10YR 6/4) mottles; moderate fine and very fine subangular blocky structure; firm, sticky, plastic; few fine roots; thin continuous red (2.5YR 4/6) and light yellowish brown (10YR 6/4) clay films; 2 percent quartzite pebbles and black (10YR 2/1) oxide concretions 0.06 to 0.5 inch in diameter; common fine flakes of mica; strongly acid; clear smooth boundary.

B23t—40 to 51 inches, red (2.5YR 4/8) light clay; weak medium subangular blocky structure; firm, sticky, plastic; common fine flakes of mica; thin continuous red (2.5YR 4/6) clay films; strongly acid; clear smooth boundary.

C—51 to 60 inches, reddish yellow (7.5YR 6/8) loam; massive; friable, nonsticky, slightly plastic; common fine flakes of mica; common strongly weathered rock fragments; thin red (2.5YR 4/6) clay flows in cracks; strongly acid.

The solum thickness ranges from 40 to 60 inches. Depth to hard rock is more than 60 inches. Reaction is very strongly acid or strongly acid throughout the profile unless limed.

The texture of the C horizon is variable, ranging from clay loam to loam.

Colfax series

The Colfax series consists of deep, moderately well drained to somewhat poorly drained soils that have a fragipan at a depth of 18 to 35 inches. The soils formed in colluvial material on smooth, low divides between large drainage systems and at the head of intermittent drainageways. Slopes range from 2 to 15 percent.

Colfax soils are commonly near Wedowee, Masada, Sedgefield, and Forestdale soils. All of these soils have a thicker, more clayey subsoil than Colfax soils.

Typical pedon of Colfax fine sandy loam, 2 to 7 percent slopes, in a wooded area 1.5 miles northwest of Manakin and 0.25 mile southwest of Highway 621:

Ap—0 to 7 inches; gray (5Y 5/1) fine sandy loam; few fine distinct strong brown (7.5YR 5/6) mottles; weak medium granular structure; very friable, nonsticky, nonplastic; many fine roots; very strongly acid; abrupt wavy boundary.

A2—7 to 10 inches; pale yellow (5Y 7/3) fine sandy loam; weak medium granular structure with pockets of weak thick platy structure; slightly brittle, friable, nonsticky, nonplastic; few fine roots; 10 percent rounded angular quartz pebbles up to 0.5 inch in diameter; very strongly acid; abrupt wavy boundary.

B2t—10 to 21 inches; yellowish brown (10YR 5/6) clay loam; common fine and medium distinct light gray (5Y 7/1) mottles and few fine distinct strong brown (7.5Y 5/6) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; thin patchy clay films; very strongly acid; clear wavy boundary.

Bx1—21 to 28 inches; pale yellow (5Y 7/3) clay loam; 5 percent pockets of fine sandy loam; common coarse distinct light olive brown (2.5Y 5/4) mottles and few medium distinct brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; brittle, slightly sticky, slightly plastic; thin patchy clay films; 2 percent rounded quartz pebbles up to 2 inches in diameter; very strongly acid; gradual wavy boundary.

Bx2—28 to 44 inches; pale yellow (5Y 7/3) clay loam; few coarse distinct yellow (10YR 7/6) mottles; few medium light gray (10YR 7/1) clay flows; few thin pale olive (5Y 6/3) coatings in cracks and channels; weak coarse subangular blocky structure; brittle, slightly sticky, nonplastic; 50 percent strongly weathered rock fragments that crush to fine sandy loam; strongly acid; clear wavy boundary.

C—44 to 64 inches; strong brown (7.5YR 5/8); strongly weathered rock that crushes to fine sandy loam; common coarse distinct pale yellow (5Y 7/3) mottles; massive; friable; common dark oxide stains; strongly acid.

The solum thickness ranges from 30 to 50 inches. Depth to hard rock is more than 5 feet. Depth to the fragipan ranges from 18 to 35 inches. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The A horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 to 6.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of of 4 to 8. Low- and high-chroma mottles are in the upper part of the Bt horizon.

The texture of the Bx horizon includes clay loam, sandy loam, loam, and sandy clay loam. The Bx horizon has hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 to 6.

The C horizon is mainly loam, fine sandy loam, or sandy loam. In a few areas it is sandy clay loam. It contains a high percentage of soft, weathered rock fragments.

Creedmoor series

The Creedmoor series consists of deep, moderately well drained soils that formed in residuum weathered from sandstone and shale of Triassic age. Slopes range from 2 to 15 percent.

Creedmoor soils are commonly near Pinkston and Colfax soils. Pinkston soils are shallower and have a less clayey subsoil than the Creedmoor soils. The Colfax soils

have a fragipan that is not typical of the Creedmoor soils.

Typical pedon of Creedmoor fine sandy loam, 2 to 7 percent slopes, eroded, in a wooded area 0.5 mile south of the intersection of Highways 6 and 649, and 300 feet west of St. James Church on Highway 649:

O1—1 inch to 0, loose leaves and twigs.
A1—0 to 2 inches, dark grayish brown (10YR 4/2) fine sandy loam; weak very fine granular structure; very friable, nonsticky, nonplastic; many fine roots; 2 percent rounded and angular quartz pebbles up to 0.5 inch in diameter; very strongly acid; abrupt smooth boundary.
A2—2 to 6 inches, pale yellow (2.5Y 7/4) fine sandy loam; few fine faint light yellowish brown (10YR 6/4) mottles; weak fine granular structure; friable, nonsticky, nonplastic; few fine roots; 2 percent fine dark concretions; 2 percent rounded quartz pebbles up to 1.5 inches in diameter; very strongly acid; clear smooth boundary.
B1—6 to 9 inches, pale yellow (2.5Y 7/4) sandy clay loam; common fine distinct reddish yellow (7.5YR 6/6) mottles; weak fine subangular blocky structure; friable, slightly sticky, nonplastic; 2 percent fine dark concretions; 2 percent rounded quartz pebbles up to 1.5 inches in diameter; few fine roots; very strongly acid; clear smooth boundary.
B21t—9 to 16 inches, yellowish red (5YR 5/6) clay; few medium distinct yellow (10YR 7/6) and red (2.5YR 5/6) mottles; moderate medium subangular blocky structure; friable, very sticky, very plastic; few fine roots; thin continuous clay films; 2 percent rounded quartz pebbles up to 1 inch in diameter; few very fine flakes of mica; very strongly acid; clear wavy boundary.
B22t—16 to 24 inches, strong brown (7.5YR 5/6) clay; few medium distinct yellow (10YR 7/6) and red (2.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, very sticky, very plastic; few fine roots; thin continuous clay films; 2 percent rounded quartz pebbles up to 1 inch in diameter; few very fine flakes of mica; very strongly acid; clear wavy boundary.
B23t—24 to 31 inches, strong brown (7.5YR 5/6) clay; common medium distinct brownish yellow (10YR 6/6) and red (2.5YR 4/6) mottles; weak fine subangular blocky structure; firm, sticky, plastic; few fine roots; thin continuous clay films; few fine flakes of mica; very strongly acid; clear wavy boundary.
B3t—31 to 42 inches, mottled light gray (10YR 7/1), brownish yellow (10YR 6/6), and strong brown (7.5YR 5/8) clay; 30 percent weak fine subangular blocky structure, 70 percent massive; friable, sticky, plastic; few fine roots; very strongly acid; clear irregular boundary.
IIC—42 to 66 inches, yellow (2.5Y 7/6) sandy loam; light gray (5Y 7/2) clay flows; streaks of brownish yellow (10YR 6/6) and yellowish red (5YR 5/6); few fine flakes of mica; very strongly acid.

The solum thickness ranges from 40 to 51 inches, and depth to hard bedrock is more than 60 inches. Reaction ranges from extremely acid to strongly acid throughout the profile unless limed.

The A1 or Ap horizon has hue of 10YR and 2.5Y, value of 4 to 7, and chroma of 2 to 4.

The upper part of the B horizon ranges from pale yellow to strong brown and has hue of 2.5Y to 7.5YR, value of 5 to 7, and chroma of 4 or 6. The lower part of the B horizon is highly variable in color. It has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. The lower part of the B horizon generally has gray and light gray mottles.

The texture of the C horizon is variable, ranging from sandy loam to clay loam.

Enon series

The Enon series consists of deep, well drained soils that formed in material weathered from dark-colored basic rock. Enon soils are on ridgetops and side slopes on the Piedmont Plateau. Slopes range from 2 to 15 percent.

Enon soils are commonly near Sedgefield, Orange, and Wilkes soils. Sedgefield and Orange soils are not as well drained as Enon soils, and Wilkes soils have a thinner solum and less clay in the Bt horizon.

Typical pedon of Enon fine sandy loam, 2 to 7 percent slopes, in a wooded area 0.25 mile north of the junction of Highways 673 and 615, 150 feet west of Highway 615:

Ap—0 to 9 inches, yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; common fine roots; 2 percent quartz pebbles up to 3 inches in diameter; slightly acid; abrupt smooth boundary.
B1t—9 to 12 inches, yellowish brown (10YR 5/4) sandy clay loam; common fine faint light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; 2 percent quartz pebbles and weathered feldspar fragments up to 0.5 inch in diameter; slightly acid; abrupt smooth boundary.
B2t—12 to 19 inches, yellowish brown (10YR 5/6) clay; moderate fine and medium subangular blocky structure; very firm, sticky, plastic; few fine roots; thin continuous clay films; common fine black (10YR 2/1) minerals; 10 percent weathered feldspar fragments up to 1 inch in diameter; neutral; clear smooth boundary.
B3t—19 to 22 inches, yellowish brown (10YR 5/6) clay; strong coarse subangular blocky structure; very firm,

sticky, plastic; few fine roots; thin continuous clay films; 30 percent pockets of weathered feldspar and fine black (10YR 2/1) minerals; vertical clay flows up to 0.5 inch thick; evident slickensides; neutral; gradual wavy boundary.

C—22 to 30 inches, yellowish brown (10YR 5/6) clay loam; massive; firm, sticky, plastic; common thin clay coatings in seams and channels; 80 percent fine black (10YR 2/1) minerals and weathered feldspar; neutral; gradual wavy boundary.

Cr—30 to 60 inches, strongly weathered rock composed of black (10YR 2/1) minerals and weathered feldspar; crushes to sandy loam; neutral.

The solum thickness ranges from 20 to 36 inches. Depth to hard rock is more than 60 inches. Reaction is slightly acid to neutral throughout the profile.

The A horizon ranges from yellowish brown (10YR 5/4) to dark grayish brown (2.5Y 5/2).

The Bt horizon is strong brown, yellowish brown, or brownish yellow. It has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 or 8.

The C horizon ranges from clay loam to sandy loam.

Fluvanna series

The Fluvanna series consists of deep, well drained soils that formed in material weathered from acid igneous and metamorphic rock. The soils are on complex ridges and side slopes. Slopes range from 2 to 15 percent. Fluvanna soils in this survey area are a taxadjunct because laboratory data indicate oxidic mineralogy.

Fluvanna soils are commonly near Appling, Georgeville, and Sedgefield soils. Appling soils have less silt in the subsoil than Fluvanna soils, Georgeville soils are redder in the Bt horizons than Fluvanna soils, and Sedgefield soils are not as well drained.

Typical pedon of Fluvanna fine sandy loam, 2 to 7 percent slopes, eroded, in a wooded area 0.9 mile northeast of Broad Branch at Highway 676, 0.6 mile west of Highway 623, and 200 feet north of dirt farm lane:

A1—0 to 1 inch, grayish brown (10YR 5/2) fine sandy loam; weak very fine granular structure; very friable, nonsticky, nonplastic; many fine and few medium roots; 10 percent angular quartzite pebbles up 1 inch in diameter; very strongly acid; abrupt smooth boundary.

A2—1 to 8 inches, light yellowish brown (2.5Y 6/4) fine sandy loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak fine granular structure; very friable, nonsticky, nonplastic; common fine and few medium roots; 2 percent angular quartzite pebbles up to 2 inches in diameter; very strongly acid; clear smooth boundary.

B1—8 to 11 inches, brownish yellow (10YR 6/6) loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; 5 percent angular quartzite pebbles up to 0.5 inch in diameter; very strongly acid; clear wavy boundary.

B21t—11 to 19 inches, strong brown (7.5YR 5/8) light clay; strong very fine subangular blocky structure; firm, sticky, plastic; few fine and medium roots; thin continuous clay films; very strongly acid; gradual wavy boundary.

B22t—19 to 31 inches, strong brown (7.5YR 5/6) clay; few fine distinct brownish yellow (10YR 6/6) and common fine prominent red (2.5YR 4/6) mottles; strong very fine subangular blocky structure; very firm, sticky, plastic; few fine roots; thin continuous clay films; few fine mica flakes; very strongly acid; gradual wavy boundary.

B23t—31 to 45 inches, reddish yellow (7.5YR 6/6) clay; few fine prominent gray (10YR 6/1) mottles and common coarse prominent red (10R 4/8) mottles; moderate very fine subangular blocky structure; very firm, sticky, plastic; few fine roots; thin continuous clay films; few fine mica flakes; very strongly acid; gradual wavy boundary.

C1—45 to 72 inches, mottled red (10R 4/8), white (N 8/0), and yellowish brown (10YR 5/8) heavy silty clay loam; massive; friable, sticky, plastic; few fine roots; few thin quartz stringers; very strongly acid.

C2—72 to 84 inches, white (N 8/0) silty clay loam with pockets of silt loam; few medium prominent brownish yellow (10YR 6/8) mottles and many medium and coarse prominent red (10R 4/8) mottles; massive; friable, slightly sticky, slightly plastic; few fine roots; few strong brown (7.5Y 5/6) clay coatings in seams and root channels; very strongly acid.

The solum thickness ranges from 30 to 50 inches. Depth to hard rock is more than 60 inches. Reaction is strongly acid or very strongly acid throughout the solum unless limed.

The Bt horizon is yellowish red, strong brown, or yellowish brown. It has hue of 5YR through 10YR, value of 5 or 6, and chroma of 4 to 8. High-chroma mottles are common.

The C horizon is commonly more than 30 inches thick. Its texture is silt loam, loam, or silty clay loam.

Forestdale series

The Forestdale series consists of deep, poorly drained soils that formed in a mixture of colluvial and local alluvial sediments derived from granite, gneiss, or schist. The soils are generally along drainageways. Slopes range from 0 to 2 percent. Forestdale soils in this survey area are a taxadjunct because the solum is more than

20 percent sand and they have chroma of 3 or 4 in the upper part of the Bt horizon.

Forestdale soils are commonly near Colfax, Creedmoor, Sedgefield, and Vance soils. All of these soils are better drained than the Forestdale soils. The Colfax soils have a fragipan that is not typical of the Forestdale soils.

Typical pedon of Forestdale fine sandy loam, in a pasture 5.5 miles north of Fife, 0.75 mile west of the junction of Highways 606 and 601, and 500 feet west of a private driveway:

Ap—0 to 5 inches, dark grayish brown (2.5Y 4/2) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; few worm channels; 2 percent fine concretions; 5 percent fine angular quartz pebbles; slightly acid; abrupt smooth boundary.

B1t—5 to 9 inches, grayish brown (2.5Y 5/2) light clay loam; common medium distinct yellowish brown (10YR 5/6) and few fine distinct light gray (10YR 7/1) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; thin continuous light gray (N 7/0) clay films; few worm channels; 2 percent angular pebbles and cobbles; slightly acid; clear wavy boundary.

B21t—9 to 14 inches, light brownish gray (10YR 6/2) clay; many coarse faint yellowish brown (10YR 5/6) and common medium faint light gray (10YR 7/2) mottles; moderate medium columnar structure parting to weak medium subangular blocky; firm, sticky, very plastic; common fine roots; thin continuous light gray (N 7/0) clay films, patchy sand coatings on ped faces; 2 percent angular cobbles and pebbles; strongly acid; gradual wavy boundary.

B22tg—14 to 24 inches, gray (10YR 5/1) clay; common coarse distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; very firm, sticky, very plastic; few fine roots; thin continuous gray (10YR 5/1) clay films; 2 percent pebbles and cobbles; very strongly acid; gradual wavy boundary.

B31tg—24 to 31 inches, gray (10YR 5/1) clay; few fine distinct yellowish brown mottles; weak fine and medium subangular blocky structure; very firm, sticky, very plastic; few fine roots; thin discontinuous gray (10YR 5/1) clay films; 2 percent angular pebbles and cobbles; very strongly acid; clear wavy boundary.

IIB32tg—31 to 35 inches, light gray (2.5Y 7/2) sandy clay; few fine distinct yellowish brown (10YR 5/4) and common coarse distinct gray (10YR 5/1) mottles; massive; firm, sticky, very plastic; few fine roots; 10 percent fine and medium angular feldspar pebbles; 5 percent angular fine pebbles; very strongly acid; clear wavy boundary.

IIB33tg—35 to 44 inches, light gray (2.5Y 7/2) sandy clay loam; few medium distinct yellowish brown (10YR 5/6) and few fine distinct gray (10YR 5/1) mottles; massive; friable, slightly sticky, slightly plastic; few fine roots; 2 percent fine angular feldspar and quartz pebbles; very strongly acid; clear wavy boundary.

IIC—44 to 70 inches, white (2.5Y 8/2) sandy loam; weathered feldspar; very strongly acid.

The solum thickness ranges from 40 to 50 inches. Depth to hard rock is more than 60 inches. Reaction is mainly strongly acid or very strongly acid throughout the solum unless limed. In some areas the C horizon is medium acid.

The Bt horizon is gray or light gray and has brownish yellow, yellowish brown, light gray, and light olive gray mottles. The upper part of the Bt horizon is grayish brown and light brownish gray in places, with chroma of 2 or less on ped coatings. The Bt horizon has hue of 10YR and 2.5Y, value of 5 to 7, and chroma of 1 or 2.

The C horizon is sandy loam, clay loam, sandy clay, and, in a few places, silty clay.

Fork Variant

The Fork Variant consists of deep, somewhat poorly drained soils that formed in alluvium washed from Piedmont Plateau uplands underlain by basic and acidic rock. The soils are on low terraces along the James River and its larger tributaries. Slopes are mostly 0 to 2 percent.

Fork Variant soils are near Bolling, Pamunkey, and Roanoke soils. Bolling and Pamunkey soils are better drained than the Fork Variant soils, and Roanoke soils have more clay in the subsoil and are more poorly drained than Fork Variant soils.

Typical pedon of Fork Variant soils, 0.75 mile south of the junction of Routes 6 and 614, 0.8 mile southeast of the junction of Routes 6 and 600, 30 feet west of farm lane to James River:

Ap—0 to 10 inches, yellowish brown (10YR 5/4) silt loam; few fine distinct strong brown (7.5YR 5/6) mottles; moderate fine granular structure; friable, slightly sticky, nonplastic; common fine roots; many dark oxide stains; medium acid; abrupt smooth boundary.

B21t—10 to 23 inches, mottled light gray (10YR 7/1), brownish yellow (10YR 6/6), and pale yellow (5Y 7/3) clay loam; weak medium subangular blocky structure; friable, sticky, slightly plastic; few fine roots; thin continuous light gray (10YR 7/1) clay films; very strongly acid; gradual smooth boundary.

B22t—23 to 36 inches, mottled gray (10YR 6/1) and yellowish brown (10YR 5/6) silty clay loam; strong medium angular blocky structure; friable, very sticky,

plastic; few fine roots; thin continuous gray (10YR 6/1) clay films; 2 percent rounded quartz pebbles up to 1 inch in diameter; very strongly acid; gradual wavy boundary.

B23tg—36 to 46 inches, gray (10YR 6/1) silty clay; many coarse distinct yellowish brown (10YR 5/6) and pale olive (5Y 6/3) mottles; strong medium angular blocky structure; firm, very sticky, plastic; thin continuous gray (10YR 6/1) clay films; strongly acid; gradual wavy boundary.

IIC1g—46 to 58 inches, gray (10YR 6/1) sandy clay loam; many coarse distinct yellowish brown (10YR 5/6) and pale olive (5Y 6/3) mottles; massive; firm, very sticky, slightly plastic; few gray (10YR 6/1) clay flows; medium acid; gradual wavy boundary.

IIC2g—58 to 80 inches, gray (10YR 6/1) sandy clay loam; common pockets of fine sandy loam and sandy clay; many coarse distinct yellowish brown (10YR 5/6) and pale olive (5Y 6/3) mottles; massive; firm, sticky, slightly plastic; slightly acid.

The solum thickness is 45 to 60 inches or more. Depth to bedrock is more than 60 inches. Rounded quartz pebbles up to 1 inch in diameter make up 0 to 3 percent of the solum.

The A horizon has hue of 10YR and 2.5Y, value of 4 and 5, and chroma of 2 to 4. It is silt loam, loam, or fine sandy loam.

The B21t and B22t horizons are mottled with hue of 10YR to 5Y, value of 5 to 7, chroma of 1 to 6. The B23t horizon has hue of 10YR and 2.5Y, value of 5 to 7, and chroma of 1 or 2. High-chroma mottles are common. The B23t horizon is commonly silty clay or clay.

The C horizon ranges to silty clay loam.

Georgeville series

The Georgeville series consists of deep, well drained soils that formed in the weathered products of fine-grained, metamorphosed rock. The Georgeville soils are on ridgetops and side slopes of the Piedmont Plateau. Slopes range from 2 to 15 percent.

Georgeville soils are commonly near Appling, Fluvanna, Orange, and Pinkston soils. These soils have a yellower subsoil than the Georgeville soils; the Orange soils are not as well drained; and the Pinkston soils have a thinner, discontinuous subsoil.

Typical pedon of Georgeville loam in an area of Georgeville fine sandy loam, 2 to 7 percent slopes, eroded, 2.5 miles north of Manakin, 1 mile southeast of the junction of Highways 644 and 621, and 50 feet west of private road to lake:

O1—2 inches to 1 inch, loose leaves and pine needles.

O2—1 inch to 0, partly decomposed leaves and pine needles.

Ap—0 to 4 inches, brown (7.5YR 5/4) loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; very strongly acid; abrupt wavy boundary.

B1t—4 to 7 inches, red (2.5YR 5/6) clay loam; few fine distinct brown (7.5YR 5/4) mottles; weak medium subangular blocky structure; friable, sticky, slightly plastic; common fine roots; thin continuous reddish brown (2.5YR 5/4) clay films; 1 percent angular quartz pebbles up to 0.25 inch in diameter; very strongly acid; clear smooth boundary.

B21t—7 to 16 inches, red (2.5YR 5/6) clay; moderate fine and medium subangular blocky structure; friable, sticky, slightly plastic; few fine roots; thin continuous reddish brown (2.5YR 5/4) clay films; very strongly acid; clear wavy boundary.

B22t—16 to 31 inches, red (2.5YR 4/8) clay; few fine and medium distinct reddish yellow (7.5YR 6/6) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; thin continuous reddish brown (2.5YR 5/4) clay films; very strongly acid; gradual smooth boundary.

B23t—31 to 39 inches, red (2.5YR 4/8) clay; few fine and medium distinct reddish yellow (7.5YR 6/6) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; thin continuous reddish brown (2.5YR 5/4) clay films; horizontal quartz stringer 0.25 inch thick; 25 percent strongly weathered rock fragments that crush to fine sandy loam; few fine flakes of mica; very strongly acid; clear smooth boundary.

B3t—39 to 52 inches, red (2.5YR 4/8) silty clay loam; many fine distinct reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; thin continuous clay films in seams and root channels; few fine flakes of mica; very strongly acid; clear smooth boundary.

C—52 to 96 inches, red (2.5YR 4/6) silt loam; massive; friable, slightly sticky, nonplastic; few fine flakes of mica; bands of white (10YR 8/2), reddish yellow (5YR 6/8), and red (10R 4/6) 2 to 6 inches thick at a depth of more than 80 inches; very strongly acid.

The solum is 40 to 60 inches thick. Depth to hard bedrock is more than 60 inches. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The A horizon has a hue of 7.5YR, value of 4 and 5, and chroma of 2 to 4.

The B horizon has a hue of 2.5YR, value of 4 and 5, and chroma of 6 to 8.

The C horizon ranges to silty clay loam.

Hiwassee series

The Hiwassee series consists of deep, well drained soils that formed in old alluvium. The soils are on ridgetops on the Piedmont Plateau in areas generally parallel to the James River. Slopes range from 2 to 7 percent.

Hiwassee soils are commonly near Cecil, Madison, and Pacolet soils. These soils do not have the dark red subsoil typical of the Hiwassee soils.

Typical pedon of Hiwassee loam, 2 to 7 percent slopes, eroded, 0.75 mile northwest of Pemberton:

Ap—0 to 8 inches, dark reddish brown (5YR 3/4) loam; moderate fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; 2 percent rounded and angular quartz pebbles up to 1 inch in diameter; slightly acid; abrupt smooth boundary.

B21t—8 to 31 inches, dark red (2.5YR 3/6) clay; strong medium subangular blocky structure; friable, very sticky, plastic; few fine roots; thin continuous clay films; 2 percent angular and rounded quartz and quartzite pebbles up to 1 inch in diameter; medium acid; gradual wavy boundary.

B22t—31 to 75 inches, dark red (10R 3/6) clay loam; strong medium and coarse subangular blocky structure; friable, sticky, plastic; thin continuous clay films; 2 percent angular and rounded quartz and quartzite pebbles up to 1 inch in diameter; very strongly acid.

The solum is more than 50 inches thick. Depth to bedrock is more than 60 inches. Rounded and angular quartz and quartzite pebbles make up 1 to 5 percent of the solum. Stone lines are in some pedons. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The A horizon has hue of 5YR and 7.5YR, value of 3, and chroma of 2 to 4.

Louisburg series

The Louisburg series consists of moderately deep to deep, well drained to excessively drained soils that have hard bedrock at a depth of 36 to 60 inches. The soils formed in the weathered products of granite and gneiss. They are on narrow ridges and side slopes on the Piedmont Plateau. Slopes range from 2 to 45 percent.

Louisburg soils are commonly near Appling, Madison, Pacolet, and Wedowee soils. These soils have a thicker continuous argillic horizon than the Louisburg soils.

Typical pedon of Louisburg fine sandy loam, 7 to 15 percent slopes, eroded, 0.6 mile northwest of the intersection of Highways 615 and 673, and 858 feet north of Highway 673:

Ap—0 to 8 inches, yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; few fine roots; 2 percent angular quartz pebbles up to 0.5 inch in diameter; strongly acid; abrupt smooth boundary.

B—8 to 18 inches, yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; few fine roots; pockets and lenses of strong brown (7.5YR 5/6) sandy loam 2 to 8 inches thick; 40 percent thin patchy clay films and clay bridging; 2 percent angular quartz pebbles up to 0.5 inch in diameter; very strongly acid; smooth wavy boundary.

C—18 to 48 inches, brownish yellow (10YR 6/6) sandy loam; common coarse faint yellowish brown (10YR 5/8) mottles; massive; friable, nonsticky, nonplastic; 15 percent small fragments of feldspar; medium acid; clear smooth boundary.

R—48 inches, granite.

The solum thickness is 20 to 30 inches. Depth to hard bedrock is 3 to 5 feet. Angular quartz pebbles up to 1 inch in diameter make up 0 to 10 percent of the solum and 0 to 20 percent of the substratum. Reaction ranges from very strongly acid to medium acid throughout the profile.

The A horizon has a hue of 10YR, value of 4 and 5, and chroma of 2 to 4.

The B horizon has a hue of 10YR, value of 4 to 6, and chroma of 4 and 6. It ranges to sandy loam. The lenses and pockets of the argillic horizon have a hue of 7.5YR, value of 4 and 5, and chroma of 6 and 8. They range to sandy clay loam.

Madison series

The Madison series consists of deep, well drained soils that formed in the weathered products of gneiss and schist and have a high content of mica. The Madison soils are on ridgetops and side slopes of the Piedmont Plateau. Slopes range from 2 to 45 percent.

Madison soils are commonly near Cecil, Pacolet, and Tallapoosa Variant soils. Cecil and Pacolet soils do not have the high content of mica in the subsoil typical of the Madison soils. The Tallapoosa Variant soils have a thinner and less clayey subsoil than the Madison soils.

Typical pedon of Madison fine sandy loam, 2 to 7 percent slopes, eroded, 0.25 mile north of Highway 632, and 1 mile east of the intersection of Highways 522 and 632 at county landfill 1:

Ap—0 to 6 inches, strong brown (7.5YR 5/6) fine sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine roots; 1 percent angular quartz pebbles up to 0.5 inch in diameter; few fine flakes of mica; very strongly acid; abrupt smooth boundary.

B21t—6 to 18 inches, red (2.5YR 5/6) clay; few fine and medium distinct reddish brown (5YR 4/4) mottles; weak fine subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin continuous clay films; 1 percent angular quartz pebbles up to 3 inches in diameter; many fine flakes of mica; very strongly acid; gradual smooth boundary.

B22t—18 to 30 inches, red (2.5YR 4/8) clay; common coarse distinct yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin continuous clay films; 1 percent angular pebbles and weathered feldspar fragments up to 0.25 inch in diameter; many fine flakes of mica; very strongly acid; clear wavy boundary.

B3t—30 to 40 inches, red (2.5YR 4/6) loam; few medium distinct yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; firm, nonsticky, nonplastic; few fine roots; thin patchy clay films; 1 foot wide diagonal band of common weathered feldspar fragments; many fine flakes of mica; very strongly acid; clear wavy boundary.

C1—40 to 81 inches, red (2.5YR 4/6) loam; common coarse prominent light olive brown (2.5Y 5/4) mottles; massive; friable, nonsticky, nonplastic; few fine roots; few thin clay flows; many fine flakes of mica; few weathered feldspar fragments in lower part; very strongly acid; clear wavy boundary.

C2—81 to 96 inches, yellowish brown (10YR 5/4) loam; massive; very friable, nonsticky, nonplastic; few fine roots; few soft weathered feldspar fragments; many fine flakes of mica; strongly acid.

The solum thickness is 21 to 40 inches. Depth to hard bedrock is more than 60 inches. Angular quartz pebbles up to 3 inches in diameter make up 0 to 10 percent of the solum. Weathered feldspar fragments are in the lower part of the subsoil and in the substratum. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The A horizon has hue of 7.5YR, 10YR, and 5YR; value of 4 and 5, and chroma of 2 to 6. Severely eroded areas have a clay loam A horizon with hue of 5YR or 2.5YR, value of 4 and 5, and chroma of 4 and 6.

The B2 horizon has hue of 2.5YR and 5YR, value of 4 and 5, and chroma of 6 and 8. It ranges from clay to clay loam. The B3 horizon is loam to clay loam.

Masada series

The Masada series consists of deep, well drained soils that formed in old alluvium. The Masada soils are on ridgetops and side slopes on high terraces of the Piedmont Plateau. Slopes are 2 to 15 percent.

Masada soils are commonly near Appling, Madison, Pacolet, and Turbeville soils. Appling soils have kaolinitic mineralogy. The Madison, Pacolet, and Turbeville soils have a redder subsoil than the Masada soils.

Typical pedon of Masada fine sandy loam, 7 to 15 percent slopes, 0.75 mile southeast of the junction of Routes 650 and 649, 0.5 mile south of Route 650:

A1—0 to 3 inches, dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; slightly acid; abrupt smooth boundary.

A2—3 to 9 inches, yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; common fine roots; 2 percent rounded and angular sandstone pebbles up to 1 inch in diameter; slightly acid; clear smooth boundary.

B1—9 to 14 inches, light yellowish brown (10YR 6/4) loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; 2 percent rounded sandstone pebbles up to 0.5 inch in diameter; slightly acid; clear smooth boundary.

B21t—14 to 27 inches, strong brown (7.5YR 5/6) sandy clay; few fine distinct brownish yellow (10YR 6/6) and reddish brown (5YR 5/4) mottles; moderate medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin patchy yellowish red (5YR 5/8) clay films; 2 percent rounded sandstone and quartz pebbles up to 1 inch in diameter; strongly acid; abrupt smooth boundary.

B22t—27 to 41 inches, brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) sandy clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin discontinuous yellowish red (5YR 5/8) clay films; 2 percent rounded and angular quartz pebbles up to 0.25 inch in diameter; strongly acid; clear smooth boundary.

B3t—41 to 60 inches, brownish yellow (10YR 6/6) sandy clay; common medium distinct light gray (10YR 7/1) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; firm, sticky, plastic; thin patchy yellowish red (5YR 5/8) clay films; very strongly acid.

The solum thickness is 40 to 80 inches. Depth to bedrock is more than 60 inches. Rounded and angular quartz and sandstone pebbles make up 0 to 5 percent of the solum. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The A horizon has a hue of 10YR, value of 4 and 5, and chroma of 2 to 4.

The Bt horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 6 to 8. It commonly has high-chroma mottles, and mottles with chroma of 2 or less often occur below a depth of 40 inches. The Bt horizon is sandy clay or clay.

Mayodan series

The Mayodan series consists of deep, well drained soils that formed in material weathered from Triassic-age shale and sandstone. The soils are on upland ridgetops and side slopes of the lower Piedmont Plateau. Slopes range from 2 to 25 percent.

Mayodan soils are commonly near the Creedmoor and Pinkston soils. The Creedmoor soils have a more plastic subsoil and are not as well drained as the Mayodan soils, and the Pinkston soils are shallower to bedrock and do not have the continuous argillic horizon typical of the Mayodan soils.

Typical pedon of Mayodan fine sandy loam, 7 to 15 percent slopes, eroded, on a dead end road along I-64, 400 feet north of I-64, and 0.75 mile east of the junction of Highway 623 and I-64:

Ap—0 to 7 inches, light yellowish brown (2.5Y 6/4) fine sandy loam; weak very fine granular structure; very friable, nonsticky, nonplastic; few fine roots; strongly acid; clear smooth boundary.

B21t—7 to 18 inches, strong brown (7.5YR 5/8) clay; few fine distinct yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; thin continuous clay films; very strongly acid; clear smooth boundary.

B22t—18 to 26 inches, strong brown (7.5YR 5/6) clay; common medium distinct yellowish red (5YR 5/6) and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; thin continuous clay films; few fine flakes of mica; very strongly acid; clear smooth boundary.

B23t—26 to 36 inches, reddish yellow (7.5YR 6/6) clay; common medium distinct red (2.5YR 5/6) and light olive brown (2.5Y 5/4) mottles; weak medium subangular blocky structure; firm, sticky, plastic; few fine roots; thin patchy clay films; few fine flakes of mica; very strongly acid; clear smooth boundary.

B3t—36 to 45 inches, yellowish red (5YR 5/8) light clay loam; common fine distinct pale brown (10YR 6/3) and reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; firm, sticky, plastic; thin patchy clay films; 5 percent weathered feldspar fragments; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C1—45 to 58 inches, strong brown (7.5YR 5/8) loam; common medium distinct light gray (10YR 7/2), yellowish red (5YR 5/8), and light olive brown (2.5Y 5/6) mottles; friable, slightly sticky, slightly plastic; few thin strata of red (2.5YR 4/6) clay; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C2—58 to 63 inches, yellowish red (5YR 5/8) loam; very friable, nonsticky, nonplastic; few fine flakes of mica; very strongly acid.

The solum thickness ranges from 40 to 60 inches. Depth to hard rock is more than 60 inches. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

Nearly half of the pedons have a B1 horizon that is dominantly reddish yellow (7.5YR 6/6) and in a few areas yellowish brown (10YR 5/6). It ranges from loam to sandy clay loam. The B2t horizon has hue of 7.5YR to 5YR, value of 5 or 6, and chroma of 6 or 8.

The C horizon ranges from loam to clay loam and is variable in color.

Monacan series

The Monacan series consists of deep, moderately well drained and somewhat poorly drained soils that formed in alluvium. The soils are on flood plains of streams throughout the county.

Monacan soils are commonly near Bolling, Buncombe, Fork Variant, and Tuckahoe soils. Monacan soils do not have the argillic horizon of the Bolling and Fork Variant soils, have less sand and more silt than the Buncombe soils, and are not as well drained as the Buncombe or Tuckahoe soils.

Typical pedon of Monacan silt loam, on Sabot Island, 0.4 mile south of the intersection of Routes 6 and 644, and 400 feet northeast of the James River:

Ap—0 to 12 inches, dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable, nonsticky, nonplastic; common fine roots; few very fine dark colored oxide concretions; few fine flakes of mica; slightly acid; clear smooth boundary.

B21—12 to 25 inches, dark yellowish brown (10YR 4/4) silt loam; few fine faint grayish brown (10YR 5/2), light yellowish brown (10YR 6/4), and dark brown (7.5YR 3/2) mottles; weak coarse subangular blocky structure; friable, nonsticky, slightly plastic; few fine roots; common fine dark colored oxide concretions and stains; few worm channels; few fine flakes of mica; slightly acid; clear smooth boundary.

B22—25 to 34 inches, dark yellowish brown (10YR 4/4) silt loam; common fine faint grayish brown (10YR 5/2) and brown (7.5YR 4/4) mottles; weak coarse subangular blocky structure; friable; slightly sticky, slightly plastic; few fine roots; few fine dark colored oxide stains and concretions; few fine flakes of mica; medium acid; clear smooth boundary.

B23—34 to 42 inches, grayish brown (10YR 5/2) silty clay loam; few fine faint dark yellowish brown (10YR 4/4) and gray (10YR 5/1) mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine dark colored

oxide concretions and stains; few fine flakes of mica; medium acid; abrupt wavy boundary.

IIBbg—42 to 63 inches, gray (5Y 5/1) clay; few fine distinct dark yellowish brown (10YR 3/4) and yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; firm, sticky, slightly plastic; few fine roots; thin patchy gray (5Y 5/1) clay films on faces of peds and in root channels; many dark colored oxide concretions up to 0.5 inch in diameter; many fine flakes of mica; medium acid.

Depth to bedrock is more than 5 feet. Coarse fragments make up less than 5 percent, by volume, of the profile above a depth of 40 inches. The content of mica flakes ranges from none to many. Reaction is neutral to strongly acid throughout the profile.

The A horizon has a hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 4. It is sandy loam, fine sandy loam, loam, or silt loam.

The B horizon mainly has hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 3 or 4. The lower part of the B horizon ranges to hue of 5Y and chroma of 1. The B horizon is sandy loam, loam, silt loam, sandy clay loam, clay loam, or silty clay loam. The Bb horizon, where present, has hue of 10YR to 5Y or N, value of 5 or 6, and chroma of 0 to 2. It is silty clay or clay.

The C horizon, where present, ranges from clay to sand or gravel.

Nason series

The Nason series consists of deep, well drained soils that formed in the weathered products of schist and phyllite. The soils are on ridgetops and side slopes of the Piedmont Plateau. Slopes range from 2 to 25 percent.

Nason soils are commonly near Orange and Tatum soils. Orange soils are more poorly drained than the Nason soils, and they are more sticky and plastic in the subsoil; Tatum soils have a redder subsoil.

Typical pedon of Nason loam, 2 to 7 percent slopes, eroded, 1.7 miles north of the intersection of Routes 605 and 610, 150 feet west of Route 605:

Ap1—0 to 2 inches, yellowish brown (10YR 5/4) loam; moderate fine granular structure; very friable, nonsticky, nonplastic; many fine and few medium roots; 8 percent semirounded and angular quartzite pebbles up to 3 inches in diameter; strongly acid; abrupt wavy boundary.

Ap2—2 to 6 inches, brown (7.5YR 5/4) loam; weak fine granular structure; friable, slightly sticky, nonplastic; common fine and few medium roots; 8 percent semirounded and angular quartzite and ferruginous sandstone pebbles up to 3 inches in diameter; strongly acid; clear wavy boundary.

B21t—6 to 10 inches, yellowish red (5YR 4/8) clay loam; strong fine and medium subangular blocky structure; friable, sticky, plastic; common fine roots; thin continuous clay films; 2 percent angular quartzite and ferruginous sandstone pebbles up to 1 inch in diameter; very strongly acid; clear wavy boundary.

B22t—10 to 20 inches, yellowish red (5YR 4/8) silty clay; few medium prominent red (2.5YR 4/6) mottles and few fine distinct reddish yellow (7.5YR 6/6) mottles; strong fine and medium subangular blocky structure; firm, sticky, plastic; few fine roots; thin continuous clay films; 2 percent angular quartzite and ferruginous sandstone pebbles up to 1.5 inches in diameter; very strongly acid; clear wavy boundary.

B23t—20 to 31 inches, yellowish red (5YR 4/8) silty clay; common medium prominent dark red (2.5YR 3/6) mottles and common medium distinct reddish yellow (7.5YR 6/6) mottles; strong fine and medium angular blocky structure; friable, sticky, slightly plastic; few fine and medium roots; thin continuous clay films; 2 percent angular quartzite pebbles up to 0.5 inch in diameter; very strongly acid; clear wavy boundary.

B3t—31 to 39 inches, mottled yellowish red (5YR 4/8), red (2.5YR 4/6), and reddish yellow (7.5YR 6/6) silty clay loam; weak coarse subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; thin continuous clay films; very strongly acid; clear wavy boundary.

C1—39 to 85 inches, mottled yellowish red (5YR 4/8), red (2.5YR 4/6), reddish yellow (7.5YR 6/6), and white (10YR 8/2) silty clay loam; massive; friable, slightly sticky, slightly plastic; fragmented quartz vein 0.5 inch thick; very strongly acid; gradual smooth boundary.

C2—85 to 99 inches, mottled yellowish red (5YR 4/8), red (2.5YR 4/6), and reddish yellow (7.5YR 6/6) silt loam; massive; friable, nonsticky, slightly plastic; very strongly acid.

The solum is 25 to 50 inches thick. Depth to hard bedrock is more than 60 inches. Semirounded and angular quartz, quartzite, and ferruginous sandstone pebbles up to 3 inches in diameter make up 2 to 10 percent of the profile. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The A horizon has hue of 10YR and 7.5YR, value of 4 and 5, and chroma of 2 to 4.

The B horizon has hue of 7.5YR and 5YR, value of 4 and 5, and chroma 6 to 8. High-chroma mottles are commonly in the lower part of the B horizon. The B horizon ranges from clay loam to clay.

Orange series

The Orange series consists of deep, somewhat poorly drained and moderately well drained soils that formed in

the weathered products of hornblende schist and other basic rock. The soils are on ridgetops and side slopes of the Piedmont Plateau. Slopes range from 2 to 15 percent.

Orange soils are commonly near Enon, Madison, Sedgefield, and Vance soils. Enon, Madison, and Vance soils are better drained than Orange soils, Madison soils are redder, and Sedgefield soils have less silt throughout the profile.

Typical pedon of Orange loam, 2 to 7 percent slopes, 0.5 mile east of the intersection of Routes 673 and 606 and 300 feet south of Route 673:

Ap—0 to 6 inches, grayish brown (10YR 5/2) loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; many fine pores; medium acid; clear smooth boundary.

A2—6 to 10 inches, light yellowish brown (2.5Y 6/4) loam; many fine distinct brownish yellow (10YR 6/6) and common fine faint light brownish gray (2.5Y 6/2) mottles; weak thick platy structure parting to weak fine subangular blocky; friable, slightly sticky, nonplastic; few fine roots; many fine and medium pores; medium acid; clear wavy boundary.

B21t—10 to 19 inches, light yellowish brown (2.5Y 6/4) clay; many fine faint light brownish gray (2.5Y 6/2) and common fine and medium distinct yellowish brown (10YR 5/6) mottles; strong medium angular blocky structure; very firm, very sticky, very plastic; few fine roots; thin continuous clay films; common slickenslides; slightly acid; gradual wavy boundary.

B22t—19 to 33 inches, light olive brown (2.5Y 5/4) clay; moderate coarse angular blocky structure; very firm, very sticky, very plastic; few fine roots; thin continuous clay films; 2 percent angular quartz pebbles up to 1 inch in diameter; common dark minerals; few slickenslides; mildly alkaline; gradual wavy boundary.

B3t—33 to 39 inches, pale olive (5Y 6/3) sandy clay with thin lenses of clay; common fine and medium faint olive (5Y 5/4) and pale yellow (5Y 7/3) mottles; weak coarse subangular blocky structure; friable, sticky, plastic; few fine roots; thin patchy clay films; many fine flakes of vermiculite; few dark minerals; mildly alkaline; gradual wavy boundary.

C1—39 to 51 inches, mottled pale yellow (5Y 7/3) sandy clay loam; massive; friable, slightly sticky, slightly plastic; many fine flakes of vermiculite; mildly alkaline; gradual wavy boundary.

C2—51 to 65 inches, olive (5Y 5/3) loam; massive; very friable, nonsticky, nonplastic; 65 percent fine flakes of vermiculite; mildly alkaline.

The solum is 23 to 40 inches thick. Depth to hard bedrock is more than 48 inches. Angular quartz pebbles up to 3 inches in diameter make up 0 to 5 percent of the solum. Reaction ranges from medium acid to mildly alkaline in the upper part of the profile and slightly acid to mildly alkaline in the lower part.

The A horizon has hue of 10YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4.

The Bt horizon has hue of 2.5Y, 10YR, 7.5YR, and 5Y; value of 4 to 6, and chroma of 3 to 8. It has high-chroma and low-chroma mottles.

The C horizon is commonly up to 80 percent flakes of vermiculite.

Pacolet series

The Pacolet series consists of deep, well drained soils that formed in the weathered products of granite and gneiss. The soils are on ridgetops and side slopes of the Piedmont Plateau. Slopes range from 2 to 25 percent.

Pacolet soils are commonly near Appling, Madison, and Wedowee soils. Appling and Wedowee soils have less red in the subsoil than the Pacolet soils, and Madison soils have a higher content of mica flakes throughout the profile.

Typical pedon of Pacolet fine sandy loam, 2 to 7 percent slopes, eroded, 0.25 mile south of Route 250, 1 mile southeast of the junction of Routes 250 and 670, and 300 feet west of lane to old house:

O1—2 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partly decomposed dark reddish brown (5YR 3/2) organic matter with many fine roots.

Ap—0 to 4 inches, reddish brown (5YR 4/4) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; 2 percent rounded and angular quartz pebbles up to 3 inches in diameter; few fine mica flakes; strongly acid; clear smooth boundary.

B1t—4 to 7 inches, yellowish red (5YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable, nonsticky, nonplastic; many fine roots; 2 percent rounded and angular quartz pebbles up to 3 inches in diameter; few fine flakes of mica; strongly acid; clear smooth boundary.

B2t—7 to 27 inches, red (10R 4/6) clay; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and medium roots; thin continuous clay films; 2 percent angular quartz pebbles up to 2 inches in diameter; few fine flakes of mica; very strongly acid; gradual smooth boundary.

B3t—27 to 34 inches, red (2.5YR 4/6) clay loam; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few reddish yellow (7.5YR 6/6) fragments of weathered granite; common fine flakes of mica; very strongly acid; clear wavy boundary.

C1—34 to 42 inches, red (2.5YR 4/6) sandy clay loam; massive; friable, nonsticky, nonplastic; few fine

roots; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C2—42 to 62 inches, red (2.5YR 4/8) loam; few medium distinct reddish yellow (7.5YR 7/8) mottles and few medium faint red (2.5YR 5/8) mottles; massive; friable, nonsticky, nonplastic; few fine roots; many fine flakes of mica; very strongly acid.

The solum is 25 to 37 inches thick. Depth to hard bedrock is more than 60 inches. Angular and rounded quartz pebbles up to 3 inches in diameter make up 0 to 5 percent of the profile. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The A horizon has hue of 5YR and 7.5YR, value of 4 and 5, and chroma of 4 and 6. Its texture includes clay loam where the soils are severely eroded.

The B2t and B3t horizons have hue of 2.5YR and 10R, value of 4 and 5, and chroma of 6 and 8.

The C horizon texture range includes loam and sandy loam.

Pamunkey series

The Pamunkey series consists of deep, well drained soils that formed in alluvium. The soils are on low terraces along the James River and its tributaries. Slopes range from 0 to 4 percent. Pamunkey soils in this survey area are a taxadjunct because they have low-chroma mottles and a higher silt content in the B3 horizon than is defined in the range for the series.

Pamunkey soils are commonly near Tuckahoe, Fork Variant, Monacan, and Bolling soils. Tuckahoe and Monacan soils do not have the argillic horizon typical of the Pamunkey soils. The Bolling and Fork Variant soils are not as well drained as Pamunkey soils.

Typical pedon of Pamunkey loam, 0 to 4 percent slopes, 9.5 miles east of Goochland and 1,000 feet southwest of the junction of Highways 644 and 6:

Ap—0 to 9 inches, dark brown (10YR 4/3) loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; medium acid; abrupt smooth boundary.

B21t—9 to 29 inches, brown (7.5YR 4/4) silty clay loam; few fine faint pale brown (10YR 6/3) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; thin continuous brown (7.5YR 4/2) clay films; few dark stains and fine concretions; few fine flakes of mica; medium acid; diffuse smooth boundary.

B22t—29 to 46 inches, brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; thin continuous brown (7.5YR 5/4) clay films; pale brown (10YR 6/3) silt coatings in seams and root channels; many fine dark concretions; 1 percent round quartzite pebbles up to 3 inches in diameter; few fine flakes of mica; strongly acid; gradual wavy boundary.

B3t—46 to 72 inches, brown (7.5YR 4/4) silty clay loam; few coarse faint dark yellowish brown (10YR 4/4) and few medium and coarse distinct light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; firm, sticky, plastic; few fine roots; thin patchy clay films; common fine dark concretions and stains; common fine flakes of mica; strongly acid.

The solum thickness ranges from 40 inches to more than 60 inches. Depth to bedrock is more than 60 inches.

The A horizon has hue of 10YR and 7.5YR, value of 3 to 5, and chroma of 2 to 4.

The B horizon has hue of 7.5YR and 5YR, value of 4 and 5, and chroma of 4 and 6. Most pedons have high-chroma mottles in the B horizon, and many have mottles with chroma of 2 or less below a depth of 40 inches. The B horizon texture range includes sandy clay loam.

Pinkston series

The Pinkston series consists of moderately deep, well drained to excessively drained soils that formed in material weathered from Triassic-age sandstone and shale of the lower Piedmont Plateau. Slopes range from 7 to 45 percent.

Pinkston soils are commonly near Mayodan and Creedmoor soils. Mayodan and Creedmoor soils have a thick clay argillic horizon that is not typical in the Pinkston soils.

Typical pedon of Pinkston fine sandy loam, 7 to 15 percent slopes, eroded, in a wooded area 0.75 mile northwest of Manakin and 650 feet east of Highway 623:

O1—2 inches to 1 inch, loose leaves, pine needles, and twigs.

O2—1 inch to 0, partially decomposed organic matter with many roots.

A1—0 to 1 inch, grayish brown (10YR 5/2) fine sandy loam; moderate very fine granular structure; very friable, nonsticky, nonplastic; many fine roots; strongly acid; abrupt wavy boundary.

A2—1 to 7 inches, light yellowish brown (10YR 6/4) fine sandy loam; weak medium granular structure; friable, nonsticky, nonplastic; common fine roots; 2 percent angular slightly weathered to highly weathered rock fragments up to 3 inches in diameter; 2 percent quartz fragments up to 1 inch in diameter; strongly acid; gradual wavy boundary.

B1—7 to 12 inches, light yellowish brown (10YR 6/4) loam; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; few fine and medium roots; 2 percent angular partially weathered

rock fragments up to 1 inch in diameter; 2 percent quartz fragments up to 1 inch in diameter; few very fine flakes of mica; very strongly acid; clear smooth boundary.

B2—12 to 17 inches, light yellowish brown (10YR 6/4) loam; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; common very fine flakes of mica; 2 percent highly weathered rock fragments up to 0.5 inch in diameter; 40 percent brown (7.5YR 5/4) clay loam with thin patchy clay films; very strongly acid; clear wavy boundary.

C—17 to 35 inches, light brown (7.5YR 6/4), very pale brown (10YR 7/3), and yellowish brown (10YR 5/6) fine sandy loam; 10 percent weathered rock fragments up to 6 inches in diameter that can be crushed to sandy loam; common fine flakes of mica; very strongly acid.

R—35 inches, weathered sandstone and shale.

The solum thickness ranges from 12 to 26 inches. Depth to hard rock ranges from 30 to 50 inches or more. In many pedons hard rock is at a depth of 30 to 40 inches. It is nearly impermeable. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The B horizon has hue of 5YR through 10YR, value of 5 to 7, and chroma of 4 to 6. Most pedons have a B2t horizon of thin intermittent clay loam less than 10 inches thick.

The texture range of the C horizon includes loam, sandy loam, or loamy sand.

Roanoke series

The Roanoke series consists of deep, poorly drained soils that formed in alluvium. The soils are on low terraces along streams, in large drainageways, and on low flats. Slopes are commonly 0 to 2 percent.

Roanoke soils are commonly near Bolling, Fork Variant, and Wehadkee soils. Bolling and Fork Variant soils are better drained than Roanoke soils, and Wehadkee soils have less clay in the subsoil.

Typical pedon of Roanoke silt loam, 0.75 mile south of the junction of Routes 600 and 6:

O1—2 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, decomposed leaves and twigs; many fine roots; very strongly acid.

A1—0 to 2 inches, dark gray (10YR 5/1) silt loam; few fine distinct pale yellow (2.5Y 7/4) mottles; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; very strongly acid; abrupt wavy boundary.

A2—2 to 9 inches, light brownish gray (2.5Y 6/2) silt loam; few very fine distinct brownish yellow (10YR 6/6) mottles; weak fine granular structure; very friable, slightly sticky, nonplastic; few fine and medium roots; very strongly acid; clear smooth boundary.

B1g—9 to 15 inches, light gray (5Y 7/2) light clay loam; common fine distinct light yellowish brown (2.5Y 6/4) mottles; moderate fine angular blocky structure; friable, sticky, slightly plastic; few fine and medium roots; very strongly acid; clear smooth boundary.

B21tg—15 to 26 inches, light gray (5Y 7/1) clay; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; firm, very sticky, plastic; thin continuous clay films; very strongly acid; clear wavy boundary.

B22tg—26 to 35 inches, mottled gray (N 6/0), brownish yellow (10YR 6/6), and light yellowish brown (2.5Y 6/4) clay; moderate medium angular blocky structure; firm, very sticky, very plastic; thin continuous clay films; very strongly acid; clear wavy boundary.

B23tg—35 to 50 inches, gray (10YR 5/1) clay; few fine distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; very firm, very sticky, very plastic; thin continuous clay films; very strongly acid; clear wavy boundary.

C1g—50 to 62 inches, mottled light olive gray (5Y 6/2) and gray (10YR 5/1) clay; massive; very firm, very sticky, plastic; very strongly acid; gradual wavy boundary.

IIC2g—62 to 70 inches, mottled light yellowish brown (2.5Y 6/4) and gray (10YR 6/1) sandy clay; massive; firm, very sticky, plastic; few fine flakes of mica; very strongly acid.

The solum is 40 to 50 inches thick. Depth to bedrock is more than 60 inches.

The A horizon has hue of 10YR and 2.5Y, value of 4 to 6, and chroma of 1 and 2. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The Bt horizon is neutral or has hue of 10YR to 5Y, value of 5 to 7, and chroma of 0 to 2. It commonly has high-chroma mottles. The texture range of the Bt horizon includes silty clay.

The C horizon ranges from sandy loam to clay.

Sedgefield series

The Sedgefield series consists of deep, moderately well drained soils that formed in residuum weathered from mixed basic and acidic rock. The soils are on broad areas, weakly convex ridgetops, and weakly concave side slopes on the Piedmont Plateau. Slopes are 2 to 15 percent. The Sedgefield soils in this county are a taxadjunct because they have a thicker solum than is defined for the series and some of the colors are outside the series range.

Sedgefield soils are commonly near Colfax, Forestdale, Vance, and Wedowee soils. The Colfax soils

have a fragipan that is not typical of the Sedgefield soils. The Forestdale soils are not as well drained as the Sedgefield soils, and the Vance and Wedowee soils are better drained.

Typical pedon of Sedgefield fine sandy loam, 2 to 7 percent slopes, 0.5 mile southwest of the intersection of Routes 606 and 609, 100 feet west of Route 606:

A1—0 to 4 inches, gray (10YR 5/1) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; common fine pores; moderately alkaline; abrupt wavy boundary.

A2—4 to 11 inches, light yellowish brown (2.5Y 6/4) fine sandy loam; common fine distinct yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common oxide stains and concretions up to 0.5 inch in diameter; common fine roots; common fine pores; slightly acid; clear smooth boundary.

B1t—11 to 18 inches, olive yellow (2.5Y 6/6) sandy clay loam; common fine faint yellowish brown (10YR 5/6) mottles and few medium distinct gray (10YR 6/1) mottles; moderate fine subangular blocky structure; friable, slightly sticky, plastic; few fine roots; few fine pores; thin patchy light yellowish brown (10YR 6/4) clay films; 2 percent angular feldspar pebbles up to 0.5 inch in diameter; strongly acid; gradual wavy boundary.

B21t—18 to 27 inches, mottled gray (10YR 5/1), light gray (10YR 7/1), and reddish yellow (7.5YR 6/8) sandy clay; moderate fine angular blocky structure; firm, sticky, very plastic; few fine roots; few fine pores; thin continuous gray (10YR 6/1) clay films; 4 percent angular feldspar pebbles up to 0.5 inch in diameter; strongly acid; gradual wavy boundary.

B22t—27 to 41 inches, pale olive (5Y 6/3) clay; common fine prominent reddish yellow (7/5YR 6/8) mottles, common medium distinct light yellowish brown (2.5Y 6/4) mottles, and common medium faint light brownish gray (2.5Y 6/2) mottles; weak coarse angular blocky structure; very firm, sticky, very plastic; few fine roots; thin continuous gray (10YR 6/1) clay films; 2 percent angular feldspar pebbles up to 0.25 inch in diameter; strongly acid; gradual wavy boundary.

B3t—41 to 45 inches, mottled light olive gray (5Y 6/2), yellow (5Y 7/6), and greenish gray (5G 5/1) clay loam; few small pockets of clay; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; thin patchy gray (10YR 6/1) clay films; strongly acid; gradual wavy boundary.

C—45 to 72 inches, pale yellow (5Y 7/4) loam; common fine faint yellow (5Y 7/6) mottles, few medium distinct greenish gray (5G 5/1) mottles, and few coarse prominent reddish yellow (7.5YR 6/8) mottles; massive; very friable, nonsticky, plastic; few greenish gray (5G 5/1) clay flows along root channels; strongly acid.

The solum is 27 to 48 inches thick. Depth to bedrock is more than 60 inches. Reaction is strongly acid or medium acid throughout the profile unless limed.

The A horizon has hue of 10YR and 2.5Y, value of 4 to 6, and chroma of 1 to 4.

The B horizon has hue of 10YR, 2.5Y, and 5Y; value of 5 to 7; and chroma of 1 to 8.

The C horizon is loam or fine sandy loam.

Tallapoosa Variant

The Tallapoosa Variant consists of deep, well drained soils that formed in residuum weathered from micaceous rocks. The soils are on narrow, convex ridgetops and convex side slopes of the Piedmont Plateau. Slopes range from 7 to 50 percent.

Tallapoosa Variant soils are commonly near Louisburg, Madison, Pacolet, and Wedowee soils. The Louisburg soils have less red in the subsoil than the Tallapoosa Variant soils, and they do not have the continuous argillic horizon. The Madison, Pacolet, and Wedowee soils have a thicker solum and more clay in the argillic horizon than the Tallapoosa Variant soils.

Typical pedon of Tallapoosa Variant fine sandy loam, 15 to 25 percent slopes, eroded, 0.5 mile south of Route 608 and 1 mile west of Route 45:

A1—0 to 2 inches, brown (7.5YR 4/2) fine sandy loam; moderate fine granular structure; very friable, slightly sticky, nonplastic; many fine roots; 2 percent angular quartz and feldspar pebbles up to 3 inches in diameter; few fine flakes of mica; strongly acid; abrupt smooth boundary.

B1t—2 to 6 inches, brown (7.5YR 4/4) clay loam; many fine distinct reddish brown (5YR 4/4) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; 2 percent angular quartz and feldspar pebbles up to 3 inches in diameter; few fine flakes of mica; very strongly acid; clear smooth boundary.

B2t—6 to 15 inches, red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable, sticky, slightly plastic; common fine roots; thin coninuous clay films; many fine flakes of mica; 10 percent strongly weathered feldspar fragments; very strongly acid; gradual irregular boundary.

C—15 to 72 inches, soft strongly weathered reddish yellow (7.5YR 6/6) micaceous rock that crushes easily to loam; mostly feldspar and mica; massive; few fine roots; thin reddish brown (2.5YR 4/4) clay flows in seams and root channels in upper 15 inches; 5 percent angular quartz pebbles up to 3 inches in diameter; very strongly acid.

The solum is 10 to 20 inches thick. Depth to hard bedrock is more than 5 feet. Angular quartz pebbles up to 3 inches in diameter and strongly weathered angular feldspar fragments up to 6 inches in diameter make up 2 to 20 percent of the solum and 5 to 20 percent of the substratum. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The A horizon has hue of 7.5YR and 5YR, value of 4 and 5, and chroma of 2 and 4.

The B horizon has hue of 7.5YR and 2.5YR, value of 4 and 5, and chroma of 4 and 6. It is sandy clay loam, loam, or clay loam.

The C horizon is sandy loam or loam.

Tatum series

The Tatum series consists of deep, well drained soils that formed in the weathered products of schist and phyllite rock. The soils are on ridgetops and side slopes of the Piedmont Plateau. Slopes range from 2 to 25 percent.

Tatum soils are commonly near Nason and Wedowee soils, which have less red in the subsoil.

Typical pedon of Tatum loam, 2 to 7 percent slopes, eroded, 2,000 feet southeast of the junction of Routes 605 and 681:

Ap—0 to 4 inches, yellowish brown (10YR 5/4) loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine roots, 2 percent angular quartz pebbles up to 1 inch in diameter; very strongly acid; abrupt smooth boundary.

B1t—4 to 7 inches, red (2.5YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable, sticky, slightly plastic; few fine roots; thin patchy clay films; very strongly acid; clear smooth boundary.

B2t—7 to 20 inches, red (2.5YR 5/6) clay; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; thin continuous clay films; 2 percent angular quartz pebbles up to 1 inch in diameter; very strongly acid; clear smooth boundary.

B3t—20 to 32 inches, red (2.5YR 5/6) silty clay loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; thin patchy clay films; very strongly acid; clear smooth boundary.

C1—32 to 45 inches, weathered gray (5YR 5/1) schist that crushes easily to silt loam; red (2.5YR 4/6) clay flows in seams and channels; massive; very strongly acid; gradual wavy boundary.

C2—45 to 60 inches, weathered gray (5YR 5/1) schist that crushes to silt loam; few fragments of hard schist; very strongly acid.

The solum is 30 to 45 inches thick. Depth to hard bedrock is more than 60 inches in most pedons. Angular quartz pebbles up to 2 inches in diameter make up 0 to 5 percent of the solum. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The A horizon has hue of 10YR and 7.5YR, value of 4 and 5, and chroma of 2 to 4.

The B horizon has a hue of 2.5YR, value of 4 and 5, and chroma of 6 to 8. It ranges to silty clay.

The C horizon is commonly highly weathered rock that crushes to silt loam or light silty clay loam.

Tuckahoe series

The Tuckahoe series consists of deep, well drained soils that formed in alluvium washed from uplands underlain by igneous and metamorphic rock of the Piedmont Plateau. The soils are on flood plains along the larger streams in the county. Slopes are mostly 0 to 2 percent.

Tuckahoe soils are commonly near Buncombe, Monacan, and Pamunkey soils. Buncombe soils are sandier than Tuckahoe soils, and Monacan soils are not as well drained. Pamunkey soils have an argillic horizon that is not typical in the Tuckahoe soils.

Typical pedon of Tuckahoe loam in an area of Tuckahoe soils, 1.7 miles southeast of the intersection of Routes 600 and 627, 50 feet east of the James River:

Ap—0 to 10 inches, dark brown (10YR 4/3) loam; moderate fine granular structure; very friable, nonsticky, slightly plastic; common fine roots; common fine pores; few fine flakes of mica; few worm casts; neutral; clear smooth boundary.

B1—10 to 17 inches, brown (10YR 4/3) loam; weak fine subangular blocky structure; friable, nonsticky, slightly plastic; common fine roots; common fine pores; few fine flakes of mica; neutral; clear wavy boundary.

B21—17 to 30 inches, brown (10YR 4/3) clay loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine pores; few fine flakes of mica; slightly acid; clear wavy boundary.

B22—30 to 43 inches, dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine pores; few fine flakes of mica; slightly acid; clear wavy boundary.

B23—43 to 61 inches, brown (7.5YR 5/4) loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; patchy light yellowish brown (10YR 6/4) sand coatings on ped faces; few fine flakes of mica; slightly acid; gradual wavy boundary.

C—61 to 68 inches, brown (7.5YR 5/4) silt loam; massive; friable, nonsticky, slightly plastic; few fine roots; few dark oxide stains; few fine flakes of mica; slightly acid.

The solum is 40 to 60 inches thick or more. Depth to bedrock is more than 60 inches. Rounded quartz pebbles up to 3 inches in diameter make up 0 to 5 percent of the solum above a depth of 40 inches. Fine flakes of mica range from few to many. Reaction ranges from strongly acid to neutral.

The A horizon has hue of 10YR and 7.5YR, value of 4, and chroma of 2 to 4.

The B horizon has hue of 10YR and 7.5YR, value of 3 to 5, and chroma of 3 to 6. Low-chroma mottles are in some pedons below a depth of 24 inches.

Turbeville series

The Turbeville series consists of deep, well drained soils that formed in old alluvium. The soils are on ridgetops and side slopes of the Piedmont Plateau. Slopes range from 2 to 15 percent.

Turbeville soils are commonly near Hiwassee, Madison, Masada, and Pacolet soils. The Hiwassee soils have a darker subsoil than the Turbeville soils, the Madison and Pacolet soils have a thinner solum, the Madison soils contain more mica throughout, and the Masada soils have more yellow in the subsoil.

Typical pedon of Turbeville fine sandy loam, 2 to 7 percent slopes, eroded, in a roadcut 1.5 miles west of Johnsons Springs, on the north side of Route 621.

Ap1—0 to 6 inches, yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; medium acid; abrupt smooth boundary.

Ap2—6 to 10 inches, yellowish brown (10YR 5/4) fine sandy loam; few fine distinct yellowish red (5YR 5/6) mottles; weak fine granular structure; friable, slightly sticky, nonplastic; many fine roots; medium acid; abrupt smooth boundary.

B21t—10 to 14 inches, yellowish red (5YR 5/6) sandy clay loam; few fine distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; thin patchy clay films; strongly acid; clear smooth boundary.

B22t—14 to 30 inches, red (2.5YR 4/8) sandy clay; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable, sticky, slightly plastic; few fine roots; thin continuous clay films; 2 percent feldspar fragments up to 0.25 inch in diameter; very strongly acid; clear smooth boundary.

B23t—30 to 97 inches, red (10R 4/8) clay loam; weak medium subangular blocky structure; friable, sticky, slightly plastic; thin continuous clay films; 1 percent subrounded quartz pebbles up to 0.25 inch in diameter; very strongly acid; clear smooth boundary.

B24t—97 to 99 inches, red (2.5YR 4/8) sandy clay; few medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky, slightly plastic; thin patchy clay films; very strongly acid.

The solum is more than 60 inches thick. Depth to bedrock is more than 60 inches.

The A horizon has a hue of 10YR, value of 4 and 5, and chroma of 3 to 6. It is sandy clay loam where severely eroded.

The B horizon has hue of 5YR, 2.5YR, and 10R; value of 3 to 5; and chroma of 6 and 8. The texture range of the B horizon includes clay.

Udorthents

Udorthents in this county consist of deep, well drained to excessively drained soils that do not have diagnostic subsurface horizons. The soils formed in old coal-mine spoil or in quarry waste material. They are in old, filled mine shafts and pits and in active or abandoned rock quarries.

Udorthents are near Creedmoor, Fluvanna, Georgeville, Mayodan, and Wedowee soils. Udorthents do not have the argillic horizon typical of these soils.

Because of the variability of these soils, a typical pedon is not given. In general, the soils have a thin A horizon that ranges in hue from 10YR to 2.5Y, value from 2 to 6, and chroma from 0 to 4. The A horizon ranges from sand, sandy loam, and loam to very gravelly sand and sandy loam. The substratum has hue of 10YR and 2.5Y, value of 2 to 6, and chroma of 0 to 8. The substratum ranges from gravelly loam and gravelly sandy loam to mostly pebbles, cobbles, and boulders, with small amounts of sandy and loamy material. Locally, coarse fragments are dominantly black, shaly coal refuse.

Depth to rock is commonly more than 5 feet. Reaction ranges from medium acid to extremely acid. Pebbles, cobbles, and boulders make up 10 percent to over 90 percent of the soil, and the amount and composition vary widely from place to place.

Vance series

The Vance series consists of deep, well drained soils that formed in the weathered products of granite and granite gneiss. The soils are on ridgetops and side slopes of the Piedmont Plateau. Slopes are 2 to 15 percent.

Vance soils are commonly near Appling, Wedowee, and Sedgefield soils. Appling and Wedowee soils are not as firm and plastic in the subsoil as Vance soils; Sedgefield soils are not as well drained.

Typical pedon of Vance fine sandy loam, 2 to 7 percent slopes, 0.5 mile northeast of Routes 651 and 667:

O1—1 inch to 0, pine needles and twigs; very dark brown (10YR 2/2) partly decomposed organic matter.
Ap—0 to 7 inches, light yellowish brown (2.5Y 6/4) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and few medium roots; 2 percent rounded and angular quartz pebbles up to 2 inches in diameter; very strongly acid; abrupt smooth boundary.
A2—7 to 13 inches, yellowish brown (10YR 5/4) fine sandy loam; weak thin platy structure parting to weak fine granular; very friable, nonsticky, nonplastic; many fine roots; 2 percent rounded and angular quartz pebbles up to 2 inches in diameter; very strongly acid; clear wavy boundary.
B1t—13 to 16 inches, strong brown (7.5YR 5/6) clay loam; common fine prominent red (2.5YR 4/6) mottles; moderate fine subangular blocky structure; friable, sticky, slightly plastic; few fine roots; thin patchy clay films; 5 percent angular quartz pebbles up to 2 inches in diameter; very strongly acid; clear wavy boundary.
B21t—16 to 24 inches, yellowish brown (10YR 5/8) clay; many fine prominent red (2.5YR 4/6) and common fine distinct yellowish red (5YR 4/6) mottles; moderate fine subangular blocky structure; very firm, very sticky, plastic; few fine roots; thin continuous clay films; 2 percent angular quartz pebbles up to 2 inches in diameter; few fine flakes of mica; very strongly acid; clear wavy boundary.
B22t—24 to 29 inches, yellowish brown (10YR 5/8) clay; few medium faint light yellowish brown (10YR 6/4) mottles, many fine prominent red (2.5YR 4/6) mottles, and common fine distinct yellowish red (5YR 4/6) mottles; moderate fine subangular blocky structure; very firm, very sticky, plastic; few fine roots; thin continuous clay films; few fine flakes of mica; very strongly acid; gradual wavy boundary.
B23t—29 to 38 inches, strong brown (7.5YR 5/8) clay; common coarse prominent red (2.5YR 4/6) mottles and few medium distinct light yellowish brown (10YR 6/4) mottles; moderate thick platy structure parting to moderate fine subangular blocky; very firm, very sticky, plastic; few fine roots; thin continuous clay films; few fine flakes of mica; very strongly acid; gradual wavy boundary.
B3t—38 to 45 inches, mottled yellowish brown (10YR 5/6) and red (2.5YR 4/6) clay; moderate thick platy structure parting to moderate fine subangular blocky; firm, very sticky, plastic; few fine roots; thin continuous clay films; few fine flakes of mica; 2 percent fine highly weathered feldspar fragments; very strongly acid; clear wavy boundary.
C—45 to 68 inches, red (2.5YR 4/8) clay loam; massive; friable, slightly sticky, slightly plastic; 5 percent fine highly weathered feldspar fragments; few fine flakes of mica; very strongly acid.

The solum is 30 to 45 inches thick. Depth to bedrock is more than 60 inches. Rounded and angular quartz pebbles up to 2 inches in diameter make up 0 to 10 percent of the solum. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The A horizon has hue of 2.5Y and 10YR, value of 4 to 6, and chroma of 2 to 4.

The B horizon has hue of 10YR, 7.5YR, and 5YR; value of 4 and 5; and chroma of 4 to 8. It commonly has high-chroma mottles.

The C horizon ranges from loam or fine sandy loam to clay loam.

Wedowee series

The Wedowee series consists of deep, well drained soils that formed in the weathered products of granite and granite gneiss. The soils are on ridgetops and side slopes of the Piedmont Plateau. Slopes are 2 to 25 percent.

Wedowee soils are commonly near Pacolet, Colfax, Louisburg, and Vance soils. Pacolet soils have a redder subsoil than Wedowee soils, and Vance soils have a firmer subsoil. Colfax soils have a fragipan that is not typical of the Wedowee soils, and Louisburg soils do not have the continuous argillic horizon typical of the Wedowee soils.

Typical pedon of Wedowee fine sandy loam, 2 to 7 percent slopes, eroded, 0.75 mile west southwest of the intersection of Routes 601 and 606, 150 feet northwest of Route 601:

O1—1 inch to 0, loose leaves and partly decomposed organic material.
Ap1—0 to 1 inch, dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine roots; very strongly acid; clear smooth boundary.
Ap2—1 to 5 inches, yellowish brown (10YR 5/6) fine sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine roots; 8 percent subrounded quartzite pebbles up to 1 inch in diameter; very strongly acid; clear smooth boundary.
B21t—5 to 8 inches, yellowish red (5YR 5/8) sandy clay; common fine yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; thin patchy clay films; 4 percent subrounded quartzite pebbles up to 0.75 inch in diameter; very strongly acid; gradual smooth boundary.
B22t—8 to 20 inches, yellowish red (5YR 5/8) clay; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; thin continuous clay films; very strongly acid; gradual smooth boundary.
B23t—20 to 27 inches, yellowish red (5YR 5/8) clay; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; thin

patchy clay films; few fine flakes of mica; very strongly acid; clear wavy boundary.

B3t—27 to 37 inches, reddish yellow (5YR 6/8) and yellowish red (5YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; thin patchy clay films; few fine flakes of mica; very strongly acid; clear wavy boundary.

C1—37 to 58 inches, reddish yellow (7.5YR 7/6) clay loam; many medium and coarse distinct yellowish red (5YR 5/6) and reddish yellow (5YR 6/8) mottles; massive; friable, slightly sticky, slightly plastic; few fine roots; few pockets of clay; thin clay flows in seams and root channels; few fine flakes of mica; 2 percent angular quartz pebbles up to 0.25 inch in diameter; very strongly acid; clear wavy boundary.

C2—58 to 62 inches, reddish yellow (7.5YR 7/6) loam; many fine distinct light red (2.5YR 6/6) and common fine distinct very pale brown (10YR 7/4) mottles; massive; friable, slightly sticky, slightly plastic; few thin clay flows in seams; few fine flakes of mica; very strongly acid.

The solum is 20 to 40 inches thick. Depth to hard bedrock is more than 60 inches. Subrounded and angular quartz and quartzite pebbles up to 2 inches in diameter, make up 0 to 15 percent of the profile. Reaction is strongly acid or very strongly acid throughout the profile unless limed.

The A horizon has hue of 10YR, value of 4 and 5, and chroma of 2 to 6. It is clay loam where the soil is severely eroded.

The B horizon has hue of 5YR and 7.5YR, value of 5 to 7, and chroma of 6 and 8.

The texture range of the C horizon includes sandy clay loam and sandy loam.

Wehadkee series

The Wehadkee series consists of deep, poorly drained soils formed in alluvium washed from uplands underlain by igneous and metamorphic rock. The soils are on low flood plains along streams in the county. Slopes are 0 to 2 percent.

Wehadkee soils are commonly near Fork Variant, Monacan, and Tuckahoe soils. These nearby soils are better drained than the Wehadkee soils.

Typical pedon of Wehadkee silt loam, 0.5 mile north of the junction of Routes 603 and 667, 1.1 miles east of the junction of Routes 651 and 667, on the west bank of Little Whittle Creek:

A1—0 to 9 inches, grayish brown (10YR 5/2) silt loam; common fine distinct dark brown (10YR 4/3) mottles; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; few fine flakes of mica; neutral; abrupt smooth boundary.

B1g—9 to 15 inches, gray (10YR 5/1) loam; few medium distinct yellowish brown (10YR 5/4) mottles; weak fine granular structure; friable, nonsticky, nonplastic; many fine roots; few fine flakes of mica; partly decomposed leaves; few pockets of sand; neutral; abrupt wavy boundary.

B2g—15 to 30 inches, gray (10YR 5/1) loam; few fine distinct yellowish brown (10YR 5/4) and common fine faint light olive brown (2.5Y 5/4) mottles; weak fine angular blocky structure; friable, nonsticky, nonplastic; few fine roots; few fine flakes of mica; common pieces of charcoal; neutral; clear wavy boundary.

C1g—30 to 36 inches, gray (N 5/0) loamy sand; single grain; loose; soft, very friable, nonsticky, nonplastic; few fine mica flakes; common pieces of charcoal; few fine roots; neutral; gradual wavy boundary.

C2g—36 to 62 inches, gray (N 5/0) sandy loam; massive; very friable, slightly sticky, slightly plastic; neutral.

The solum is 30 to 60 inches thick. Depth to bedrock is more than 60 inches. Reaction ranges from medium acid to neutral throughout the profile.

The A horizon has hue of 10YR and 2.5Y, value of 4 and 5, and chroma of 1 and 2.

The B horizon is neutral or has hue of 10YR to 5Y, value of 4 to 6, and chroma of 0 and 1. The range in texture includes silt loam and silty clay loam.

The C horizon is commonly stratified sandy and loamy material. In some pedons it is gravelly or very gravelly.

Wilkes series

The Wilkes series consists of moderately deep, well drained soils that formed in the weathered products of mixed acidic and basic rock. Wilkes soils are on ridgetops and side slopes of the Piedmont Plateau. Slopes range from 2 to 45 percent. Wilkes soils are a taxadjunct in this survey area because the substratum is very strongly weathered.

Wilkes soils are commonly near Enon, Orange, Louisburg, and Pacolet soils. Enon, Orange, and Pacolet soils have a thicker solum than Wilkes soils. Louisburg soils do not have the continuous argillic horizon typical of the Wilkes soils.

Typical pedon of Wilkes fine sandy loam, 7 to 15 percent slopes, eroded, 0.4 mile southwest of the junction of Routes 667 and 651:

Ap—0 to 5 inches, dark brown (10YR 4/3) fine sandy loam; moderate fine granular structure; friable, nonsticky, nonplastic; common fine roots; few fine flakes of mica; slightly acid; abrupt smooth boundary.

B2t—5 to 12 inches, yellowish brown (10YR 5/6) clay loam; moderate fine subangular blocky structure;

firm, slightly sticky, slightly plastic; few fine roots; thin continuous clay films; common fine flakes of mica; slightly acid; clear smooth boundary.

B3—12 to 15 inches, strong brown (7.5YR 5/6) loam; few fine faint light brown (7.5YR 6/4) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine flakes of mica; common dark colored streaks; slightly acid; gradual wavy boundary.

C1—15 to 20 inches, strong brown (7.5YR 5/6) loam; massive; friable, slightly sticky, slightly plastic; many fine flakes of mica; many dark colored streaks; slightly acid; clear smooth boundary.

Cr—20 to 35 inches, strongly weathered basic rock that crushes to loam; neutral.

R—35 inches, rock.

The solum is 10 to 20 inches thick. Depth to hard bedrock is 20 to 48 inches. Angular pebbles up to 3 inches in diameter make up 0 to 15 percent of the solum, and angular cobblestones up to 6 inches in diameter make up 0 to 10 percent of the solum. Reaction is medium acid to neutral throughout the profile.

The A horizon has hue of 10YR and 7.5YR, value of 3 to 5, and chroma of 3 and 4.

The B horizon has hue of 7.5YR, 10YR and 2.5Y; value of 4 and 5; and chroma of 4 to 8. It ranges to sandy clay loam and clay.

The C horizon is commonly very strongly weathered rock that crushes easily to sandy loam and loam.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*6*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 16, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Fluvaquents (*Fluv*, meaning river or flood plain, plus *aquent*, the suborder of Entisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-loamy, mixed, nonacid, thermic, Typic Fluvaquents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

References

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to frequent flooding.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Coarse textured (light textured) soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Complex, soil. A map unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—
Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

Deferred grazing. A delay in grazing until range plants have reached a specified stage of growth. Grazing is deferred in order to increase the vigor of forage and to allow desirable plants to produce seed. Contrasts with continuous grazing and rotation grazing.

Depth to rock. Bedrock at a depth that adversely affects the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake. The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material from 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Large stones. Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Pan. A compact, dense layer in a soil. A pan impedes the movement of water and the growth of roots. The word "pan" is commonly combined with other words that more explicitly indicate the nature of the layer; for example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water forms subsurface tunnels or pipelike cavities in the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Soil scientists regard as soil only the part of the regolith that is modified by organisms and other soil-building forces. Most engineers describe the whole regolith, even to a great depth, as "soil."

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulates over disintegrating rock.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Saprolite (geology). Soft, earthy, clay-rich, thoroughly decomposed rock formed in place by chemical weathering of igneous and metamorphic rock. In soil survey, the term saprolite is applied to any unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake. The slow movement of water into the soil.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones. Rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Small stones adversely affect the specified use.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent

material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil, or partly worked into the soil, to provide protection from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use or management.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.
Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.
Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.
Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

ILLUSTRATIONS

Figure 1.—An area of Creedmoor fine sandy loam, 2 to 7 percent slopes.

Figure 2.—A road cut in an area of Madison fine sandy loam, 2 to 7 percent slopes, eroded.

Figure 3.—An exposed ditchbank in an area of Pinkston fine sandy loam, 7 to 15 percent slopes, eroded.

Figure 4.—This spoil from a rock quarry makes up the Udorthents part of the Udorthents-Quarries complex.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

Month	Temperature[1]						Precipitation[1]				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[2]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	46.7	24.2	35.5	73	-3	64	2.63	1.71	3.45	6	2.9
February---	49.0	26.4	35.7	73	5	212	3.14	1.93	4.23	7	4.7
March------	58.4	33.6	43.8	82	15	419	3.21	2.70	3.88	7	1.5
April------	69.4	43.2	56.4	89	24	492	3.00	1.88	4.00	6	.1
May--------	76.8	52.3	64.6	92	31	763	3.51	1.92	4.79	7	.0
June-------	83.6	60.2	71.9	96	42	957	3.79	1.90	5.32	6	.0
July-------	87.1	64.3	71.5	98	50	1,174	3.82	1.75	5.51	6	.0
August-----	85.9	63.7	74.9	98	49	1,082	4.72	2.97	6.29	6	.0
September--	80.5	56.9	68.7	96	36	861	3.49	1.93	4.75	5	.0
October----	70.0	44.6	57.3	88	24	536	3.37	1.30	5.03	4	.0
November---	59.9	34.6	47.3	81	14	229	3.01	1.24	4.45	6	.1
December---	49.5	27.1	38.3	73	4	139	3.34	1.59	4.75	6	1.6
Year-----	68.1	44.3	55.5	98	-5	6,928	41.03	35.13	47.99	72	10.9

[1]Recorded in the period 1951-74 at Ashland, Virginia.

[2]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature[1]		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 22	April 25	May 10
2 years in 10 later than--	April 11	April 19	May 3
5 years in 10 later than--	March 22	April 7	April 20
First freezing temperature in fall:			
1 year in 10 earlier than--	October 29	October 16	October 4
2 years in 10 earlier than--	November 2	October 20	October 8
5 years in 10 earlier than--	November 9	October 29	October 16

[1]Recorded in the period 1951-74 at Ashland, Virginia.

TABLE 3.--GROWING SEASON LENGTH

Probability	Daily minimum temperature during growing season[1]		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	196	179	153
8 years in 10	208	188	162
5 years in 10	232	204	179
2 years in 10	255	220	196
1 year in 10	268	229	205

[1]Recorded in the period 1951-74 at Ashland, Virginia.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2B	Appling fine sandy loam, 2 to 7 percent slopes	524	0.3
3A	Bolling soils, 0 to 2 percent slopes	626	0.3
3B	Bolling soils, 2 to 7 percent slopes	4,972	2.6
4B	Bourne fine sandy loam, 2 to 7 percent slopes	337	0.2
5	Buncombe loamy fine sand	335	0.2
6B2	Cecil fine sandy loam, 2 to 7 percent slopes, eroded	2,819	1.5
6C2	Cecil fine sandy loam, 7 to 15 percent slopes, eroded	427	0.2
7B	Colfax fine sandy loam, 2 to 7 percent slopes	1,706	0.9
7C	Colfax fine sandy loam, 7 to 15 percent slopes	238	0.1
8B	Creedmoor fine sandy loam, 2 to 7 percent slopes	2,353	1.2
8B2	Creedmoor fine sandy loam, 2 to 7 percent slopes, eroded	1,304	0.7
8C	Creedmoor fine sandy loam, 7 to 15 percent slopes	366	0.2
8C2	Creedmoor fine sandy loam, 7 to 15 percent slopes, eroded	1,199	0.6
9B	Enon fine sandy loam, 2 to 7 percent slopes	2,462	1.3
9C2	Enon fine sandy loam, 7 to 15 percent slopes, eroded	3,117	1.7
11B2	Fluvanna fine sandy loam, 2 to 7 percent slopes, eroded	2,037	1.1
11C2	Fluvanna fine sandy loam, 7 to 15 percent slopes, eroded	1,479	0.8
12	Forestdale fine sandy loam	1,169	0.6
13A	Fork Variant soils, 0 to 2 percent slopes	758	0.4
14B2	Georgeville fine sandy loam, 2 to 7 percent slopes, eroded	658	0.3
14C2	Georgeville fine sandy loam, 7 to 15 percent slopes, eroded	559	0.3
15B2	Hiwassee loam, 2 to 7 percent slopes, eroded	514	0.3
16B2	Louisburg fine sandy loam, 2 to 7 percent slopes, eroded	170	0.1
16C2	Louisburg fine sandy loam, 7 to 15 percent slopes, eroded	1,673	0.9
16D2	Louisburg fine sandy loam, 15 to 25 percent slopes, eroded	2,886	1.5
16E2	Louisburg fine sandy loam, 25 to 45 percent slopes, eroded	1,513	0.8
17B2	Madison fine sandy loam, 2 to 7 percent slopes, eroded	6,297	3.3
17C2	Madison fine sandy loam, 7 to 15 percent slopes, eroded	8,071	4.2
17D2	Madison fine sandy loam, 15 to 25 percent slopes, eroded	2,983	1.6
18B3	Madison clay loam, 2 to 7 percent slopes, severely eroded	2,224	1.2
18C3	Madison clay loam, 7 to 15 percent slopes, severely eroded	7,039	3.7
18D3	Madison clay loam, 15 to 25 percent slopes, severely eroded	2,985	1.6
19E3	Madison, Pacolet and Wedowee clay loams, 25 to 45 percent slopes, severely eroded	1,918	1.0
21B	Masada fine sandy loam, 2 to 7 percent slopes	1,405	0.7
21C	Masada fine sandy loam, 7 to 15 percent slopes	907	0.5
22B	Mayodan fine sandy loam, 2 to 7 percent slopes	822	0.4
22C2	Mayodan fine sandy loam, 7 to 15 percent slopes, eroded	889	0.5
23	Monacan silt loam	7,020	3.7
24	Monacan complex	9,360	5.0
25B2	Nason loam, 2 to 7 percent slopes, eroded	402	0.2
25C2	Nason loam, 7 to 15 percent slopes, eroded	1,039	0.6
25D2	Nason loam, 15 to 25 percent slopes, eroded	275	0.1
26B	Orange loam, 2 to 7 percent slopes	1,237	0.7
26C	Orange loam, 7 to 15 percent slopes	398	0.2
27B2	Pacolet fine sandy loam, 2 to 7 percent slopes, eroded	9,786	5.2
27C2	Pacolet fine sandy loam, 7 to 15 percent slopes, eroded	9,563	5.1
27D2	Pacolet fine sandy loam, 15 to 25 percent slopes, eroded	2,369	1.3
28B3	Pacolet clay loam, 2 to 7 percent slopes, severely eroded	1,475	0.8
28C3	Pacolet clay loam, 7 to 15 percent slopes, severely eroded	3,538	1.9
28D3	Pacolet clay loam, 15 to 25 percent slopes, severely eroded	1,169	0.6
29A	Pamunkey loam, 0 to 4 percent slopes	613	0.3
31C2	Pinkston fine sandy loam, 7 to 15 percent slopes, eroded	427	0.2
31E2	Pinkston fine sandy loam, 25 to 45 percent slopes, eroded	332	0.2
32D2	Pinkston-Mayodan fine sandy loams, 15 to 25 percent slopes, eroded	437	0.2
33	Roanoke silt loam	271	0.1
34B	Sedgefield fine sandy loam, 2 to 7 percent slopes	3,874	2.1
34C	Sedgefield fine sandy loam, 7 to 15 percent slopes	2,891	1.5
35C2	Tallapoosa Variant fine sandy loam, 7 to 15 percent slopes, eroded	320	0.2
35D2	Tallapoosa Variant fine sandy loam, 15 to 25 percent slopes, eroded	670	0.4
35E2	Tallapoosa Variant fine sandy loam, 25 to 50 percent slopes, eroded	291	0.2
36B2	Tatum loam, 2 to 7 percent slopes, eroded	3,291	1.7
36C2	Tatum loam, 7 to 15 percent slopes, eroded	3,990	2.1
36D2	Tatum loam, 15 to 25 percent slopes, eroded	718	0.4
37	Tuckahoe soils	2,776	1.5
38B2	Turbeville fine sandy loam, 2 to 7 percent slopes, eroded	2,453	1.3
38C2	Turbeville fine sandy loam, 7 to 15 percent slopes, eroded	478	0.3
39B3	Turbeville sandy clay loam, 2 to 7 percent slopes, severely eroded	151	0.1
39C3	Turbeville sandy clay loam, 7 to 15 percent slopes, severely eroded	300	0.2
41	Udorthents, mine spoil	74	*
42	Udorthents-Quarries complex	331	0.2

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
43B	Vance fine sandy loam, 2 to 7 percent slopes	1,877	1.0
43C2	Vance fine sandy loam, 7 to 15 percent slopes, eroded	1,079	0.6
44B2	Wedowee fine sandy loam, 2 to 7 percent slopes, eroded	7,252	3.8
44C2	Wedowee fine sandy loam, 7 to 15 percent slopes, eroded	15,813	8.3
44D2	Wedowee fine sandy loam, 15 to 25 percent slopes, eroded	2,982	1.6
45B3	Wedowee clay loam, 2 to 7 percent slopes, severely eroded	244	0.1
45C3	Wedowee clay loam, 7 to 15 percent slopes, severely eroded	2,337	1.2
45D3	Wedowee clay loam, 15 to 25 percent slopes, severely eroded	466	0.2
46	Wehadkee silt loam	1,162	0.6
47B2	Wilkes fine sandy loam, 2 to 7 percent slopes, eroded	574	0.3
47C2	Wilkes fine sandy loam, 7 to 15 percent slopes, eroded	2,975	1.6
47D2	Wilkes fine sandy loam, 15 to 25 percent slopes, eroded	2,932	1.6
47E2	Wilkes fine sandy loam, 25 to 45 percent slopes, eroded	152	0.1
	Water	4,895	2.6
	Total	188,800	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[All yields were estimated for a high level of management. Absence of a yield figure indicates the crop is seldom grown or is not suited]

Soil name and map symbol	Corn	Corn silage	Wheat	Soybeans	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
2B---------- Appling	95	19	45	35	4.0	4.8	8.0
3A---------- Bolling	100	20	50	35	---	4.5	7.2
3B---------- Bolling	85	17	50	35	---	4.0	6.3
4B---------- Bourne	80	16	50	30	---	2.5	4.0
5---------- Buncombe	60	12	20	25	---	2.0	3.0
6B2---------- Cecil	95	19	45	40	5.0	5.0	8.0
6C2---------- Cecil	90	18	35	35	4.5	4.5	7.2
7B---------- Colfax	75	15	45	30	---	2.4	4.0
7C---------- Colfax	70	14	40	25	---	2.4	4.0
8B---------- Creedmoor	75	15	45	25	---	3.5	6.0
8B2, 8C---------- Creedmoor	60	12	40	20	---	3.0	5.0
8C2---------- Creedmoor	---	---	30	---	---	3.0	5.0
9B---------- Enon	85	17	45	35	---	5.1	8.2
9C2---------- Enon	75	15	40	30	---	4.8	8.0
11B2---------- Fluvanna	110	22	70	35	3.5	3.0	5.0
11C2---------- Fluvanna	100	20	60	30	3.0	3.0	5.0
12---------- Forestdale	---	---	---	---	---	2.0	3.3
13A---------- Fork Variant	90	18	50	40	---	3.0	5.0
14B2---------- Georgeville	90	18	45	40	5.0	5.0	8.0
14C2---------- Georgeville	80	16	40	35	4.5	4.5	7.0
15B2---------- Hiwassee	95	19	45	50	5.5	3.9	6.0

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Wheat	Soybeans	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
16B2---------- Louisburg	55	11	35	30	2.0	2.0	3.0
16C2---------- Louisburg	45	9	30	25	---	2.0	3.0
16D2---------- Louisburg	---	---	---	---	---	1.5	2.2
16E2---------- Louisburg	---	---	---	---	---	---	---
17B2---------- Madison	90	18	45	45	4.5	4.5	7.2
17C2---------- Madison	80	16	40	40	4.0	3.9	6.2
17D2---------- Madison	75	15	35	35	3.5	3.5	5.3
18B3---------- Madison	70	14	40	30	4.0	3.6	6.0
18C3---------- Madison	60	12	35	30	3.5	3.0	5.0
18D3---------- Madison	---	---	---	---	---	2.5	4.0
19E3---------- Madison	---	---	---	---	---	---	3.0
21B---------- Masada	120	24	50	40	4.5	4.0	6.1
21C---------- Masada	110	22	50	40	4.5	3.5	5.3
22B---------- Mayodan	95	19	45	40	3.5	4.8	8.0
22C2---------- Mayodan	85	17	40	40	3.0	4.5	7.2
23, 24---------- Monacan	80	16	50	35	4.0	3.5	6.0
25B2---------- Nason	90	18	45	30	4.5	3.0	5.0
25C2---------- Nason	85	17	45	30	4.0	2.5	4.1
25D2---------- Nason	65	13	35	25	3.5	2.5	4.1
26B---------- Orange	80	16	40	25	---	3.0	5.0
26C---------- Orange	70	14	35	20	---	2.0	3.1
27B2---------- Pacolet	80	16	45	40	4.5	3.5	6.0
27C2---------- Pacolet	75	15	40	40	4.0	3.0	5.0

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Wheat	Soybeans	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
27D2---------- Pacolet	70	14	35	35	3.5	2.5	4.0
28B3---------- Pacolet	75	15	40	35	3.5	3.0	5.0
28C3---------- Pacolet	50	10	35	30	3.0	2.5	4.1
28D3---------- Pacolet	---	---	---	---	---	2.0	3.1
29A---------- Pamunkey	120	24	75	45	5.5	4.0	6.3
31C2---------- Pinkston	65	16	30	30	---	2.5	4.0
31E2---------- Pinkston	---	---	---	---	---	---	3.0
32D2---------- Pinkston	---	---	---	---	---	2.6	4.1
33---------- Roanoke	---	---	---	---	---	2.0	3.1
34B---------- Sedgefield	85	17	35	35	---	3.3	5.2
34C---------- Sedgefield	70	14	30	25	---	3.0	5.0
35C2---------- Tallapoosa Variant	50	10	40	30	---	2.0	3.1
35D2---------- Tallapoosa Variant	---	---	---	---	---	1.5	2.2
35E2---------- Tallapoosa Variant	---	---	---	---	---	---	2.0
36B2---------- Tatum	90	18	50	30	5.0	3.0	5.0
36C2---------- Tatum	85	17	45	30	4.5	2.5	4.1
36D2---------- Tatum	65	13	35	30	---	2.0	3.1
37---------- Tuckahoe	120	24	70	45	5.5	5.0	8.0
38B2---------- Turbeville	120	24	50	45	5.5	4.0	6.3
38C2---------- Turbeville	110	22	50	40	4.5	3.5	5.3
39B3---------- Turbeville	100	20	40	35	4.0	3.0	5.0
39C3---------- Turbeville	80	16	45	30	3.5	2.0	3.1
41**, 42. Udorthents							

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Wheat	Soybeans	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
43B---------- Vance	80	16	60	35	3.5	4.8	8.0
43C2---------- Vance	75	15	55	30	3.0	4.8	8.0
44B2---------- Wedowee	80	16	45	40	3.5	3.5	5.3
44C2---------- Wedowee	75	15	40	40	3.0	3.0	5.0
44D2---------- Wedowee	60	12	35	35	---	2.5	4.0
45B3---------- Wedowee	75	15	40	30	3.0	3.0	5.0
45C3---------- Wedowee	70	14	35	30	2.5	2.5	4.1
45D3---------- Wedowee	---	---	---	---	---	2.0	3.0
46---------- Wehadkee	---	---	---	---	---	---	8.5
47B2---------- Wilkes	65	13	35	25	---	4.5	7.2
47C2---------- Wilkes	50	10	30	25	---	4.2	7.0
47D2, 47E2---------- Wilkes	---	---	---	---	---	3.9	6.2

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days.

** See the map unit description for the composition and behavior of the unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry in a column means the information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
2B---------- Appling	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Scarlet oak--------- Southern red oak---- Virginia pine------- White oak---------- Yellow-poplar-------	81 65 68 76 74 71 90	Eastern redcedar, eastern white pine, loblolly pine, yellow-poplar.
3A*, 3B*---------- Bolling	2w	Slight	Moderate	Slight	Slight	Virginia pine------- Shortleaf pine------ Loblolly pine------- Yellow-poplar-------	70 70 90 90	Loblolly pine, yellow-poplar, black walnut.
4B---------- Bourne	4w	Slight	Moderate	Slight	Moderate	Loblolly pine------- Northern red oak---- Virginia pine-------	70 65 70	Loblolly pine, Virginia pine, eastern white pine.
5---------- Buncombe	2s	Slight	Moderate	Moderate	Slight	American sycamore--- Sweetgum---------- Loblolly pine------- Yellow-poplar-------	90 90 90 100	Loblolly pine, American sycamore.
6B2, 6C2---------- Cecil	3o	Slight	Slight	Slight	Slight	Eastern white pine-- Loblolly pine------- Shortleaf pine------ Virginia pine------- Black oak---------- Northern red oak---- Post oak---------- Scarlet oak---------	80 80 69 73 66 82 65 80	Eastern white pine, loblolly pine, yellow-poplar.
7B, 7C---------- Colfax	3w	Slight	Moderate	Slight	Slight	Loblolly pine------- Red maple---------- Shortleaf pine------ Sweetgum---------- Yellow-poplar-------	80 65 70 80 80	Loblolly pine, Virginia pine, sweetgum.
8B, 8B2, 8C, 8C2--- Creedmoor	3w	Slight	Moderate	Slight	Slight	Loblolly pine------- Shortleaf pine------ Sweetgum----------	84 55 ---	Loblolly pine, sweetgum, yellow-poplar.
9B, 9C2---------- Enon	4c	Moderate	Moderate	Moderate	Slight	Loblolly pine------- Shortleaf pine------ Virginia pine-------	71 60 65	Eastern redcedar, loblolly pine, Virginia pine.
11B2, 11C2--------- Fluvanna	3o	Slight	Slight	Slight	Slight	Virginia pine------- Shortleaf pine------ Northern red oak----	74 63 70	Loblolly pine, Virginia pine.
12---------- Forestdale	1w	Slight	Severe	Moderate	Slight	Northern red oak---- Willow oak---------- Sweetgum---------- Loblolly pine-------	80 95 95 80	Sweetgum, American sycamore, loblolly pine.
13A---------- Fork Variant	2w	Slight	Moderate	Slight	Slight	Northern red oak---- Virginia pine------- Shortleaf pine------ Loblolly pine------- Sweetgum---------- Yellow-poplar-------	80 80 80 90 90 90	Loblolly pine, yellow-poplar, eastern white pine, sweetgum, Virginia pine.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
14B2, 14C2--------- Georgeville	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Longleaf pine------- Shortleaf pine------ White oak---------- Scarlet oak--------- Southern red oak----	81 67 63 69 70 67	Loblolly pine, Virginia pine, eastern redcedar, black walnut, yellow-poplar.
15B2--------------- Hiwassee	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Northern red oak---- Shortleaf pine------ White oak---------- Yellow-poplar-------	75 70 70 70 85	Loblolly pine, yellow-poplar.
16B2, 16C2--------- Louisburg	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Southern red oak---- Yellow-poplar------- Virginia pine------- White oak----------	77 69 72 84 71 68	Loblolly pine, Virginia pine, yellow-poplar.
16D2, 16E2--------- Louisburg	3r	Moderate	Moderate	Slight	Slight	Loblolly pine------- Shortleaf pine------ Southern red oak---- Yellow-poplar------- Virginia pine------- White oak----------	77 69 72 84 71 68	Loblolly pine, Virginia pine, yellow-poplar.
17B2, 17C2--------- Madison	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Longleaf pine------- Shortleaf pine------ Southern red oak---- Yellow-poplar-------	73 63 66 81 96	Loblolly pine, longleaf pine, yellow-poplar.
17D2--------------- Madison	3r	Moderate	Moderate	Slight	Slight	Loblolly pine------- Longleaf pine------- Shortleaf pine------ Southern red oak---- Yellow-poplar-------	73 63 66 81 96	Loblolly pine, longleaf pine, yellow-poplar.
18B3, 18C3--------- Madison	4c	Moderate	Moderate	Moderate	Slight	Loblolly pine------- Shortleaf pine------ Longleaf pine------- Virginia pine-------	72 66 60 66	Eastern redcedar, loblolly pine, Virginia pine.
18D3--------------- Madison	3r	Moderate	Moderate	Slight	Slight	Loblolly pine------- Longleaf pine------- Shortleaf pine------ Southern red oak---- Yellow-poplar-------	73 63 66 81 96	Loblolly pine, longleaf pine, yellow-poplar.
19E3*: Madison-----------	3r	Moderate	Moderate	Slight	Slight	Loblolly pine------- Longleaf pine------- Shortleaf pine------ Southern red oak---- Yellow-poplar-------	73 63 66 81 96	Loblolly pine, longleaf pine, yellow-poplar.
Pacolet-----------	4c	Severe	Severe	Severe	Slight	Loblolly pine------- Shortleaf pine------ Yellow-poplar-------	70 60 80	Loblolly pine, shortleaf pine, yellow-poplar.
Wedowee-----------	3r	Severe	Severe	Slight	Slight	Loblolly pine------- Virginia pine------- Shortleaf pine------ Southern red oak---- Northern red oak---- White oak----------	80 70 70 70 70 65	Loblolly pine, Virginia pine, eastern redcedar, yellow-poplar.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
21B, 21C---------- Masada	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Eastern white pine,
						Virginia pine-------	70	Virginia pine,
						Shortleaf pine------	70	loblolly pine,
						Yellow-poplar-------	85	yellow-poplar.
						Eastern white pine--	80	
22B, 22C2---------- Mayodan	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	82	Loblolly pine,
						Shortleaf pine------	75	Virginia pine,
						Yellow-poplar-------	79	yellow-poplar.
23, 24*---------- Monacan	1c	Slight	Moderate	Slight	Slight	Yellow-poplar-------	100	Loblolly pine,
						Loblolly pine-------	95	yellow-poplar.
						White oak-----------	90	
25B2, 25C2--------- Nason	3o	Slight	Slight	Slight	Slight	Northern red oak----	60	Loblolly pine,
						Virginia pine-------	69	Virginia pine.
						Shortleaf pine------	66	
						Loblolly pine-------	80	
25D2---------- Nason	3r	Moderate	Moderate	Slight	Slight	Northern red oak----	60	Loblolly pine,
						Virginia pine-------	69	Virginia pine.
						Shortleaf pine------	66	
						Loblolly pine-------	80	
26B---------- Orange	4w	Slight	Moderate	Moderate	Moderate	Northern red oak----	60	Loblolly pine,
						Virginia pine-------	60	Virginia pine.
						Shortleaf pine------	60	
						Loblolly pine-------	70	
26C---------- Orange	4w	Moderate	Moderate	Moderate	Moderate	Northern red oak----	60	Loblolly pine,
						Virginia pine-------	60	Virginia pine.
						Shortleaf pine------	60	
						Loblolly pine-------	70	
27B2, 27C2--------- Pacolet	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	78	Loblolly pine,
						Shortleaf pine------	70	shortleaf pine,
						Yellow-poplar-------	90	yellow-poplar.
27D2---------- Pacolet	3r	Moderate	Moderate	Slight	Slight	Loblolly pine-------	78	Loblolly pine,
						Shortleaf pine------	70	shortleaf pine,
						Yellow-poplar-------	90	yellow-poplar.
28B3, 28C3--------- Pacolet	4c	Moderate	Moderate	Moderate	Slight	Loblolly pine-------	70	Loblolly pine,
						Shortleaf pine------	60	shortleaf pine,
						Yellow-poplar-------	80	yellow-poplar.
28D3---------- Pacolet	4c	Severe	Severe	Severe	Slight	Loblolly pine-------	70	Loblolly pine,
						Shortleaf pine------	60	shortleaf pine,
						Yellow-poplar-------	80	yellow-poplar.
29A---------- Pamunkey	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Loblolly pine,
						Yellow-poplar-------	90	black walnut,
						Virginia pine-------	80	yellow-poplar.
						Shortleaf pine------	80	
31C2---------- Pinkston	4d	Moderate	Moderate	Severe	Moderate	Northern red oak----	60	Loblolly pine,
						Virginia pine-------	60	Virginia pine.
31E2---------- Pinkston	4d	Severe	Severe	Severe	Moderate	Northern red oak----	60	Loblolly pine,
						Virginia pine-------	60	Virginia pine.
32D2*:								
Pinkston----------	4d	Severe	Severe	Severe	Moderate	Northern red oak----	60	Loblolly pine,
						Virginia pine-------	60	Virginia pine.
Mayodan----------	3r	Moderate	Moderate	Moderate	Slight	Loblolly pine-------	82	Loblolly pine,
						Shortleaf pine------	75	Virginia pine,
						Yellow-poplar-------	79	yellow-poplar.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
33---------- Roanoke	2w	Slight	Severe	Severe	Slight	Pin oak---------- Loblolly pine------- Virginia pine-------	85 85 65	Loblolly pine.
34B, 34C---------- Sedgefield	3w	Slight	Moderate	Slight	Slight	Loblolly pine------- Shortleaf pine------ Virginia pine------- Southern red oak---- Sweetgum---------- Yellow-poplar------- White oak----------	80 70 70 70 80 90 70	Loblolly pine, yellow-poplar, sweetgum.
35C2---------- Tallapoosa Variant	3o	Slight	Slight	Moderate	Moderate	Loblolly pine------- White oak---------- Virginia pine------- Yellow-poplar-------	80 70 70 80	Loblolly pine, Virginia pine.
35D2---------- Tallapoosa Variant	3r	Moderate	Moderate	Moderate	Moderate	Loblolly pine------- White oak---------- Virginia pine------- Yellow-poplar-------	80 70 70 80	Loblolly pine, Virginia pine.
35E2---------- Tallapoosa Variant	3r	Severe	Severe	Moderate	Moderate	Loblolly pine------- White oak---------- Virginia pine------- Yellow-poplar-------	80 70 70 80	Loblolly pine, Virginia pine.
36B2, 36C2--------- Tatum	3o	Slight	Slight	Slight	Slight	Northern red oak---- Virginia pine------- Shortleaf pine------ Loblolly pine------- Yellow-poplar-------	72 68 65 89 89	Loblolly pine, Virginia pine.
36D2---------- Tatum	3r	Moderate	Moderate	Slight	Slight	Northern red oak---- Virginia pine------- Shortleaf pine------ Loblolly pine------- Yellow-poplar-------	72 68 65 89 89	Loblolly pine, Virginia pine.
37*---------- Tuckahoe	1o	Slight	Slight	Slight	Slight	Yellow-poplar------- Loblolly pine------- White oak----------	100 95 90	Yellow-poplar, loblolly pine, black walnut.
38B2, 38C2, 39B3, 39C3---------- Turbeville	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Yellow-poplar------- Virginia pine------- Shortleaf pine------ Northern red oak----	80 85 70 70 70	Loblolly pine, yellow-poplar, Virginia pine.
43B, 43C2---------- Vance	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Northern red oak---- Shortleaf pine------ White oak----------	76 --- --- ---	Loblolly pine, Virginia pine, yellow-poplar.
44B2, 44C2--------- Wedowee	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Virginia pine------- Shortleaf pine------ Southern red oak---- Northern red oak---- White oak----------	80 70 70 70 70 65	Loblolly pine, Virginia pine, eastern redcedar, yellow-poplar.
44D2---------- Wedowee	3r	Moderate	Moderate	Slight	Slight	Loblolly pine------- Virginia pine------- Shortleaf pine------ Southern red oak---- Northern red oak---- White oak----------	80 70 70 70 70 65	Loblolly pine, Virginia pine, eastern redcedar, yellow-poplar.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
45B3, 45C3 Wedowee	4c	Moderate	Moderate	Moderate	Slight	Loblolly pine Shortleaf pine Virginia pine	70 60 60	Loblolly pine, shortleaf pine, Virginia pine.
45D3 Wedowee	3r	Moderate	Moderate	Slight	Slight	Loblolly pine Virginia pine Shortleaf pine Southern red oak Northern red oak White oak	80 70 70 70 70 65	Loblolly pine, Virginia pine, eastern redcedar, yellow-poplar.
46 Wehadkee	1w	Slight	Severe	Severe	Moderate	Loblolly pine Sweetgum Yellow-poplar Willow oak Green ash White ash	102 93 98 90 96 88	Loblolly pine, American sycamore, yellow-poplar, sweetgum.
47B2, 47C2 Wilkes	4o	Slight	Slight	Slight	Slight	Loblolly pine Post oak Shortleaf pine Southern red oak Sweetgum	75 79 63 76 82	Eastern redcedar, loblolly pine, Virginia pine.
47D2, 47E2 Wilkes	4r	Moderate	Moderate	Slight	Slight	Loblolly pine Post oak Shortleaf pine Southern red oak Sweetgum	75 79 63 76 82	Eastern redcedar, loblolly pine, Virginia pine.

* See the map unit description for the composition and behavior of the unit.

TABLE 7.--BUILDING SITE DEVELOPMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See the text for definitions of "slight," "moderate," and "severe." Absence of an entry means the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2B Appling	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Slight	Slight.
3A*, 3B* Bolling	Severe: wetness, floods.	Severe: floods.	Severe: wetness, floods.	Severe: slope.	Severe: floods.	Moderate: floods.
4B Bourne	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Severe: wetness.	Moderate: low strength.	Slight.
5 Buncombe	Severe: floods, cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
6B2 Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
6C2 Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.	Moderate: slope.
7B Colfax	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
7C Colfax	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Moderate: slope, wetness.
8B, 8B2 Creedmoor	Severe: too clayey.	Severe: shrink-swell.	Severe: shrink-swell, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Moderate: wetness.
8C, 8C2 Creedmoor	Severe: too clayey.	Severe: shrink-swell.	Severe: shrink-swell, wetness.	Severe: shrink-swell, slope.	Severe: shrink-swell.	Moderate: wetness, slope.
9B Enon	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Slight.
9C2 Enon	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
11B2 Fluvanna	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Slight.
11C2 Fluvanna	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.	Moderate: slope.
12 Forestdale	Severe: too clayey, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: wetness.
13A Fork Variant	Severe: wetness, floods.	Severe: wetness, floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: wetness, floods.
14B2 Georgeville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
14C2 Georgeville	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
15B2---------- Hiwassee	Moderate: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope.	Moderate: low strength.	Slight.
16B2---------- Louisburg	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Slight.
16C2---------- Louisburg	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: slope.
16D2, 16E2-------- Louisburg	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
17B2---------- Madison	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
17C2---------- Madison	Moderate: too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.	Moderate: slope.
17D2---------- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
18B3---------- Madison	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Moderate: too clayey.
18C3---------- Madison	Moderate: too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.	Moderate: too clayey, slope.
18D3---------- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
19E3*:						
Madison----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pacolet----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wedowee----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
21B---------- Masada	Severe: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: too clayey.	Slight.
21C---------- Masada	Severe: too clayey.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Severe: too clayey.	Moderate: slope.
22B---------- Mayodan	Moderate: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Moderate: low strength.	Slight.
22C2---------- Mayodan	Severe: slope, too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope, low strength.	Moderate: slope, low strength.	Moderate: slope.
23, 24*---------- Monacan	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: floods.	Severe: floods.
25B2---------- Nason	Moderate: too clayey.	Moderate: low strength, shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: low strength.	Slight.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
25C2---------- Nason	Moderate: slope, too clayey.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, depth to rock, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
25D2---------- Nason	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
26B---------- Orange	Severe: too clayey, wetness.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, low strength.	Severe: low strength, shrink-swell.	Moderate: wetness.
26C---------- Orange	Severe: too clayey, wetness.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell.	Severe: slope, shrink-swell, wetness.	Severe: low strength, shrink-swell.	Moderate: slope, wetness.
27B2---------- Pacolet	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
27C2---------- Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
27D2---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
28B3---------- Pacolet	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Moderate: too clayey.
28C3---------- Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: too clayey, slope.
28D3---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
29A---------- Pamunkey	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
31C2---------- Pinkston	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: slope.
31E2---------- Pinkston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
32D2*:						
Pinkston---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mayodan----------	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: slope.
33---------- Roanoke	Severe: floods, too clayey, wetness.	Severe: floods, low strength, wetness.	Severe: floods, low strength, wetness.	Severe: floods, low strength, wetness.	Severe: floods, low strength, wetness.	Severe: floods, wetness.
34B, 34C---------- Sedgefield	Severe: too clayey, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell.	
35C2---------- Tallapoosa Variant	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
35D2, 35E2-------- Tallapoosa Variant	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
36B2-------- Tatum	Moderate: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, depth to rock.	Moderate: slope, low strength, shrink-swell.	Severe: low strength.	Slight.
36C2-------- Tatum	Moderate: slope, too clayey.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, low strength, depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope.
36D2-------- Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
37*-------- Tuckahoe	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
38B2-------- Turbeville	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Slight.
38C2-------- Turbeville	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.	Moderate: slope.
39B3-------- Turbeville	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Moderate: too clayey.
39C3-------- Turbeville	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.	Moderate: slope.
41*, 42*. Udorthents						
43B-------- Vance	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Slight.
43C2-------- Vance	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.	Moderate: slope.
44B2-------- Wedowee	Moderate: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Slight.
44C2-------- Wedowee	Moderate: slope.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, shrink-swell.	Moderate: slope.
44D2-------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
45B3-------- Wedowee	Moderate: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: too clayey.
45C3-------- Wedowee	Moderate: slope.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, shrink-swell.	Moderate: too clayey, slope.
45D3-------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
46---------- Wehadkee	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
47B2---------- Wilkes	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Slight---------	Slight.
47C2---------- Wilkes	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Moderate: slope.
47D2, 47E2-------- Wilkes	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See the map unit description for the composition and behavior of the unit.

TABLE 8.--SANITARY FACILITIES

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See the text for definitions of "slight," "moderate," "good," "fair," and other terms used to rate soils. Absence of an entry means the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2B Appling	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
3A*, 3B* Bolling	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Fair: too clayey.
4B Bourne	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Good.
5 Buncombe	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Severe: floods, seepage.	Fair: too sandy.
6B2 Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey, seepage.	Slight	Fair: too clayey.
6C2 Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey, seepage.	Moderate: slope.	Fair: too clayey, slope.
7B Colfax	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: area reclaim, wetness.
7C Colfax	Severe: slope, percs slowly, wetness.	Severe: slope, wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: area reclaim, wetness.
8B, 8B2 Creedmoor	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey.
8C, 8C2 Creedmoor	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: wetness, slope.	Poor: too clayey.
9B Enon	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey.
9C2 Enon	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
11B2 Fluvanna	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, thin layer.
11C2 Fluvanna	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, thin layer.
12 Forestdale	Severe: wetness, percs slowly.	Slight	Severe: too clayey, wetness.	Severe: wetness.	Poor: wetness.
13A Fork Variant	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Fair: too clayey.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
14B2---------- Georgeville	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight----------	Poor: too clayey.
14C2---------- Georgeville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Poor: too clayey.
15B2---------- Hiwassee	Moderate: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight----------	Fair: too clayey.
16B2---------- Louisburg	Severe: depth to rock.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: thin layer.
16C2---------- Louisburg	Severe: depth to rock.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: slope, thin layer.
16D2, 16E2---------- Louisburg	Severe: slope, depth to rock.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: slope.
17B2---------- Madison	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight----------	Fair: too clayey.
17C2---------- Madison	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: too clayey.
17D2---------- Madison	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
18B3---------- Madison	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight----------	Fair: too clayey.
18C3---------- Madison	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: too clayey.
18D3---------- Madison	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
19E3*:					
Madison----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Pacolet----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Wedowee----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
21B---------- Masada	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: too clayey.	Slight----------	Poor: too clayey.
21C---------- Masada	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
22B---------- Mayodan	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight----------	Fair: too clayey.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
22C2--- Mayodan	Moderate: slope, percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
23, 24*--- Monacan	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Good.
25B2--- Nason	Moderate: depth to rock.	Moderate: slope, seepage.	Severe: too clayey.	Slight---	Poor: too clayey.
25C2--- Nason	Moderate: slope, depth to rock.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
25D2--- Nason	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey.
26B--- Orange	Severe: percs slowly, wetness.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey.
26C--- Orange	Severe: percs slowly, wetness.	Severe: slope.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey.
27B2--- Pacolet	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight---	Fair: too clayey.
27C2--- Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.
27D2--- Pacolet	Severe: slope.	Severe: slope.	Moderate: too clayey, slope.	Severe: slope.	Poor: slope.
28B3--- Pacolet	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight---	Fair: too clayey.
28C3--- Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.
28D3--- Pacolet	Severe: slope.	Severe: slope.	Moderate: too clayey, slope.	Severe: slope.	Poor: slope.
29A--- Pamunkey	Severe: floods.	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Fair: too clayey.
31C2--- Pinkston	Severe: depth to rock.	Severe: slope.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: slope, thin layer, area reclaim.
31E2--- Pinkston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
32D2*:					
Pinkston	Severe: slope.	Severe: slope.	Severe: depth to rock, seepage.	Severe: slope.	Poor: slope.
Mayodan	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey.
33 Roanoke	Severe: floods, percs slowly, wetness.	Slight	Severe: floods, too clayey, wetness.	Severe: floods, wetness.	Poor: hard to pack, too clayey, wetness.
34B Sedgefield	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey.
34C Sedgefield	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey.
35C2 Tallapoosa Variant	Moderate: percs slowly, slope.	Severe: slope, seepage.	Severe: seepage.	Moderate: slope.	Fair: slope.
35D2 Tallapoosa Variant	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope.	Poor: slope.
35E2 Tallapoosa Variant	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope.	Poor: slope.
36B2 Tatum	Moderate: depth to rock.	Moderate: slope, seepage.	Severe: too clayey.	Slight	Poor: too clayey.
36C2 Tatum	Moderate: slope, depth to rock.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
36D2 Tatum	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey.
37* Tuckahoe	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Good.
38B2 Turbeville	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight	Poor: too clayey.
38C2 Turbeville	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
39B3 Turbeville	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight	Poor: too clayey.
39C3 Turbeville	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
41*, 42*. Udorthents					

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
43B---------- Vance	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight----------	Poor: too clayey.
43C2---------- Vance	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
44B2---------- Wedowee	Moderate: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, area reclaim.
44C2---------- Wedowee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, area reclaim, slope.
44D2---------- Wedowee	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.	Poor: slope.
45B3---------- Wedowee	Moderate: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, area reclaim.
45C3---------- Wedowee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, area reclaim, slope.
45D3---------- Wedowee	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.	Poor: slope.
46---------- Wehadkee	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
47B2---------- Wilkes	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Slight----------	Poor: thin layer.
47C2---------- Wilkes	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Moderate: slope.	Poor: thin layer.
47D2, 47E2---------- Wilkes	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: thin layer.

* See the map unit description for the composition and behavior of the unit.

TABLE 9.--CONSTRUCTION MATERIALS

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See the text for definitions of "good," "fair," and "poor." Absence of an entry means the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2B Appling	Fair: low strength, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, area reclaim.
3A*, 3B* Bolling	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
4B Bourne	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
5 Buncombe	Good	Fair: excess fines.	Poor: excess fines.	Poor: too sandy.
6B2, 6C2 Cecil	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
7B Colfax	Fair: wetness, low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: area reclaim, thin layer.
7C Colfax	Fair: wetness, low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, area reclaim, thin layer.
8B, 8B2, 8C, 8C2 Creedmoor	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
9B, 9C2 Enon	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
11B2 Fluvanna	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
11C2 Fluvanna	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
12 Forestdale	Poor: shrink-swell, wetness.	Unsuited	Unsuited	Poor: too clayey, wetness.
13A Fork Variant	Fair: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
14B2, 14C2 Georgeville	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
15B2 Hiwassee	Fair: low strength.	Unsuited	Unsuited	Poor: thin layer, too clayey.
16B2, 16C2 Louisburg	Good	Poor: excess fines.	Poor: excess fines.	Fair: thin layer.
16D2 Louisburg	Fair: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope.
16E2 Louisburg	Poor: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
17B2, 17C2 Madison	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
17D2 Madison	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, thin layer.
18B3, 18C3 Madison	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
18D3 Madison	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, thin layer.
19E3*: Madison	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, thin layer.
Pacolet	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, slope.
Wedowee	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
21B Masada	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
21C Masada	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
22B, 22C2 Mayodan	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
23, 24* Monacan	Fair: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
25B2 Nason	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
25C2 Nason	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
25D2 Nason	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
26B Orange	Poor: low strength, shrink-swell, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: area reclaim, thin layer, small stones.
26C Orange	Poor: low strength, shrink-swell, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, small stones, thin layer.
27B2, 27C2 Pacolet	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
27D2 Pacolet	Fair: low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, slope.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
28B3, 28C3---------- Pacolet	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
28D3---------- Pacolet	Fair: low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, slope.
29A---------- Pamunkey	Fair: low strength.	Fair: small stones.	Unsuited: excess fines.	Fair: thin layer, small stones.
31C2---------- Pinkston	Poor: thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, area reclaim.
31E2---------- Pinkston	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, thin layer.
32D2*: Pinkston----------	Poor: thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, thin layer.
Mayodan----------	Fair: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
33---------- Roanoke	Poor: area reclaim, low strength, wetness.	Poor: excess fines.	Poor: excess fines.	Poor: area reclaim, thin layer, wetness.
34B, 34C---------- Sedgefield	Poor: shrink-swell.	Unsuited----------	Unsuited----------	Fair: thin layer.
35C2---------- Tallapoosa Variant	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
35D2---------- Tallapoosa Variant	Fair: low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
35E2---------- Tallapoosa Variant	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
36B2, 36C2---------- Tatum	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
36D2---------- Tatum	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, too clayey.
37*---------- Tuckahoe	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
38B2, 38C2, 39B3, 39C3---------- Turbeville	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
41*, 42*. Udorthents				
43B, 43C2---------- Vance	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, too clayey.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
44B2---------- Wedowee	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, area reclaim.
44C2---------- Wedowee	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer, area reclaim.
44D2---------- Wedowee	Fair: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
45B3---------- Wedowee	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, area reclaim.
45C3---------- Wedowee	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer, area reclaim.
45D3---------- Wedowee	Fair: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
46---------- Wehadkee	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
47B2, 47C2---------- Wilkes	Fair: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
47D2---------- Wilkes	Fair: slope, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
47E2---------- Wilkes	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.

* See the map unit description for the composition and behavior of the unit.

TABLE 10.--WATER MANAGEMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. Absence of an entry means the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
2B---------- Appling	Seepage----------	Low strength----	No water--------	Not needed------	Favorable-------	Favorable.
3A*, 3B*---------- Bolling	Favorable-------	Favorable-------	Slow refill-----	Floods, wetness.	Wetness---------	Wetness.
4B---------- Bourne	Favorable-------	Favorable-------	No water--------	Percs slowly----	Erodes easily, percs slowly.	Erodes easily, percs slowly, droughty.
5---------- Buncombe	Seepage----------	Seepage----------	Deep to water	Not needed------	Not needed------	Not needed.
6B2, 6C2---------- Cecil	Seepage----------	Favorable-------	No water--------	Not needed------	Complex slope	Complex slope.
7B, 7C---------- Colfax	Favorable-------	Hard to pack, piping, low strength.	Slow refill-----	Percs slowly, wetness.	Percs slowly, wetness, erodes easily.	Percs slowly, wetness, erodes easily.
8B, 8B2---------- Creedmoor	Favorable-------	Shrink-swell----	No water--------	Not needed------	Favorable-------	Favorable.
8C, 8C2---------- Creedmoor	Favorable-------	Shrink-swell----	No water--------	Not needed------	Slope----------	Slope, erodes easily.
9B, 9C2---------- Enon	Depth to rock	Shrink-swell, hard to pack.	Deep to water	Not needed------	Erodes easily, slope, percs slowly.	Percs slowly, erodes easily.
11B2, 11C2-------- Fluvanna	Favorable-------	Compressible, low strength, hard to pack.	No water--------	Not needed------	Slope, erodes easily.	Erodes easily, slope, percs slowly.
12---------- Forestdale	Favorable-------	Compressible----	Deep to water	Wetness, percs slowly.	Not needed------	Percs slowly, wetness.
13A---------- Fork Variant	Favorable-------	Favorable-------	Favorable-------	Wetness, floods, poor outlets.	Wetness---------	Wetness.
14B2---------- Georgeville	Slope, seepage.	Compressible, low strength, erodes easily.	No water--------	Not needed------	Favorable-------	Favorable.
14C2---------- Georgeville	Slope, seepage.	Compressible, low strength, erodes easily.	No water--------	Not needed------	Complex slope, erodes easily.	Slope, erodes easily.
15B2---------- Hiwassee	Seepage----------	Compressible----	No water--------	Not needed------	Favorable-------	Favorable.
16B2, 16C2, 16D2, 16E2---------- Louisburg	Seepage----------	Piping, erodes easily.	No water--------	Not needed------	Slope----------	Slope.
17B2---------- Madison	Seepage----------	Hard to pack, piping.	No water--------	Not needed------	Favorable-------	Favorable.
17C2, 17D2-------- Madison	Seepage----------	Hard to pack, piping.	No water--------	Not needed------	Erodes easily, slope.	Slope.
18B3---------- Madison	Seepage----------	Hard to pack, piping.	No water--------	Not needed------	Favorable-------	Favorable.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
18C3, 18D3--------- Madison	Seepage----------	Hard to pack, piping.	No water---------	Not needed------	Erodes easily, slope.	Slope.
19E3*: Madison-----------	Seepage----------	Hard to pack, piping.	No water---------	Not needed------	Erodes easily, slope.	Slope.
Pacolet-----------	Seepage----------	Hard to pack----	No water---------	Not needed------	Slope-----------	Slope.
Wedowee-----------	Depth to rock, seepage.	Low strength, thin layer.	No water---------	Not needed------	Slope-----------	Slope.
21B, 21C---------- Masada	Slope-----------	Compressible, hard to pack, low strength.	No water---------	Not needed------	Slope-----------	Slope.
22B--------------- Mayodan	Seepage----------	Compressible----	No water---------	Not needed------	Favorable-------	Favorable.
22C2-------------- Mayodan	Seepage----------	Compressible----	No water---------	Not needed------	Slope-----------	Slope.
23, 24*----------- Monacan	Seepage----------	Low strength----	Slow refill-----	Floods, wetness.	Not needed------	Wetness.
25B2, 25C2, 25D2-- Nason	Depth to rock, seepage.	Compressible, low strength.	No water---------	Not needed------	Slope-----------	Erodes easily, slope.
26B, 26C---------- Orange	Favorable-------	Compressible, low strength, shrink-swell.	Depth to rock	Wetness, percs slowly.	Slope, percs slowly, wetness.	Percs slowly, wetness.
27B2, 27C2, 27D2, 28B3, 28C3, 28D3- Pacolet	Seepage----------	Hard to pack----	No water---------	Not needed------	Slope-----------	Slope.
29A--------------- Pamunkey	Seepage----------	Favorable-------	No water---------	Not needed------	Favorable-------	Favorable.
31C2, 31E2-------- Pinkston	Depth to rock, seepage, slope.	Thin layer, seepage.	No water---------	Not needed------	Depth to rock, rooting depth.	Droughty, rooting depth.
32D2*: Pinkston----------	Depth to rock, seepage, slope.	Thin layer, seepage.	No water---------	Not needed------	Depth to rock, rooting depth.	Droughty, rooting depth.
Mayodan-----------	Seepage----------	Compressible----	No water---------	Not needed------	Slope-----------	Slope.
33---------------- Roanoke	Favorable-------	Compressible, hard to pack, low strength.	Favorable-------	Floods, percs slowly, poor outlets.	Not needed------	Not needed.
34B--------------- Sedgefield	Favorable-------	Low strength, erodes easily.	Deep to water	Not needed------	Percs slowly, slope.	Percs slowly, erodes easily.
34C--------------- Sedgefield	Favorable-------	Low strength, erodes easily.	Deep to water	Not needed------	Percs slowly, slope.	Percs slowly, erodes easily.
35C2, 35D2, 35E2-- Tallapoosa Variant	Seepage----------	Low strength, seepage.	No water---------	Not needed------	Slope, erodes easily.	Slope.
36B2, 36C2, 36D2-- Tatum	Depth to rock, seepage.	Compressible, low strength.	No water---------	Not needed------	Slope-----------	Slope.
37*--------------- Tuckahoe	Seepage----------	Low strength, piping.	Slow refill-----	Not needed------	Not needed------	Not needed.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
38B2, 38C2, 39B3, 39C3---------- Turbeville	Favorable------	Compressible, hard to pack, low strength.	No water-------	Not needed-----	Slope----------	Slope.
41*, 42*. Udorthents						
43B---------- Vance	Favorable------	Hard to pack---	No water-------	Not needed-----	Percs slowly, erodes easily.	Percs slowly.
43C2---------- Vance	Favorable------	Hard to pack---	No water-------	Not needed-----	Slope, percs slowly.	Slope, percs slowly.
44B2, 44C2-------- Wedowee	Depth to rock, seepage.	Low strength, thin layer.	No water-------	Not needed-----	Favorable------	Favorable.
44D2---------- Wedowee	Depth to rock, seepage.	Low strength, thin layer.	No water-------	Not needed-----	Slope----------	Slope.
45B3, 45C3-------- Wedowee	Depth to rock, seepage.	Low strength, thin layer.	No water-------	Not needed-----	Favorable------	Favorable.
45D3---------- Wedowee	Depth to rock, seepage.	Low strength, thin layer.	No water-------	Not needed-----	Slope----------	Slope.
46---------- Wehadkee	Seepage--------	Wetness--------	Deep to water, slow refill.	Floods---------	Not needed-----	Wetness.
47B2---------- Wilkes	Depth to rock	Thin layer-----	Deep to water	Not needed-----	Depth to rock, complex slope.	Favorable.
47C2, 47D2, 47E2-- Wilkes	Depth to rock	Thin layer-----	Deep to water	Not needed-----	Depth to rock, complex slope.	Slope.

* See the map unit description for the composition and behavior of the unit.

TABLE 11.--RECREATIONAL DEVELOPMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2B Appling	Slight	Slight	Moderate: slope.	Slight	Slight.
3A* Bolling	Severe: floods.	Moderate: wetness, floods.	Moderate: wetness, floods.	Slight	Moderate: floods.
3B* Bolling	Severe: floods.	Moderate: wetness, floods.	Moderate: slope, floods, wetness.	Slight	Moderate: floods.
4B Bourne	Severe: percs slowly.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Slight.
5 Buncombe	Severe: floods, too sandy.	Moderate: floods, too sandy.	Severe: floods, too sandy.	Moderate: floods, too sandy.	Severe: floods, too sandy.
6B2 Cecil	Slight	Slight	Moderate: slope.	Slight	Slight.
6C2 Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
7B Colfax	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: slope, percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.
7C Colfax	Moderate: slope, percs slowly, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.
8B Creedmoor	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight	Moderate: wetness.
8B2 Creedmoor	Moderate: percs slowly.	Slight	Severe: percs slowly, slope.	Slight	Moderate: wetness.
8C, 8C2 Creedmoor	Moderate: percs slowly.	Moderate: slope.	Severe: percs slowly, slope.	Slight	Moderate: wetness, slope.
9B Enon	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight	Slight.
9C2 Enon	Moderate: percs slowly.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
11B2 Fluvanna	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight	Slight.
11C2 Fluvanna	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
12--- Forestdale	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
13A--- Fork Variant	Severe: floods.	Moderate: wetness, floods.	Moderate: wetness, floods.	Moderate: wetness.	Moderate: wetness, floods.
14B2--- Georgeville	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
14C2--- Georgeville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight---	Moderate: slope.
15B2--- Hiwassee	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
16B2--- Louisburg	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
16C2--- Louisburg	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight---	Moderate: slope.
16D2--- Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
16E2--- Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
17B2--- Madison	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
17C2--- Madison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight---	Moderate: slope.
17D2--- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
18B3--- Madison	Moderate: too clayey.	Moderate: too clayey.	Moderate: too clayey, slope.	Moderate: too clayey.	Moderate: too clayey.
18C3--- Madison	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope, too clayey.
18D3--- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
19E3*:					
Madison---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pacolet---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wedowee---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
21B--- Masada	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
21C--- Masada	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight---	Moderate: slope.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
22B---------- Mayodan	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
22C2---------- Mayodan	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
23, 24*---------- Monacan	Severe: floods, wetness.	Moderate: floods, wetness.	Moderate: floods, wetness.	Slight----------	Severe: floods.
25B2---------- Nason	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
25C2---------- Nason	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
25D2---------- Nason	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
26B---------- Orange	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
26C---------- Orange	Moderate: percs slowly, wetness, slope.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.
27B2---------- Pacolet	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
27C2---------- Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
27D2---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
28B3---------- Pacolet	Moderate: too clayey.	Moderate: too clayey.	Moderate: too clayey, slope.	Moderate: too clayey.	Moderate: too clayey.
28C3---------- Pacolet	Moderate: too clayey, slope.	Moderate: too clayey, slope.	Severe: slope.	Moderate: too clayey.	Moderate: too clayey, slope.
28D3---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too clayey, slope.	Severe: slope.
29A---------- Pamunkey	Severe: floods.	Moderate: floods.	Moderate: slope, floods.	Slight----------	Moderate: floods.
31C2---------- Pinkston	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
31E2---------- Pinkston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
32D2*: Pinkston----------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
32D2*: Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
33 Roanoke	Severe: floods, wetness, percs slowly.	Severe: wetness.	Severe: floods, wetness, percs slowly.	Severe: wetness.	Severe: floods, wetness.
34B, 34C Sedgefield	Moderate: percs slowly.	Moderate: wetness.	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.
35C2 Tallapoosa Variant	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
35D2 Tallapoosa Variant	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
35E2 Tallapoosa Variant	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
36B2 Tatum	Slight	Slight	Moderate: slope, depth to rock.	Slight	Slight.
36C2 Tatum	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
36D2 Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
37* Tuckahoe	Severe: floods.	Moderate: floods.	Severe: floods.	Moderate: floods.	Severe: floods.
38B2 Turbeville	Slight	Slight	Moderate: slope.	Slight	Slight.
38C2 Turbeville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
39B3 Turbeville	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope.	Moderate: too clayey.	Moderate: small stones.
39C3 Turbeville	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.
41*, 42*. Udorthents					
43B Vance	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight	Slight.
43C2 Vance	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope, percs slowly.	Slight	Moderate: slope.
44B2 Wedowee	Slight	Slight	Moderate: slope.	Slight	Slight.
44C2 Wedowee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
44D2 Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
45B3 Wedowee	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.	Moderate: too clayey.
45C3 Wedowee	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: too clayey, slope.
45D3 Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
46 Wehadkee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
47B2 Wilkes	Slight	Slight	Moderate: slope, depth to rock.	Slight	Slight.
47C2 Wilkes	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
47D2 Wilkes	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
47E2 Wilkes	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See the map unit description for the composition and behavior of the unit.

TABLE 12.--WILDLIFE HABITAT POTENTIALS

[See the text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2B---------- Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3A*---------- Bolling	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
3B*---------- Bolling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
4B---------- Bourne	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
5---------- Buncombe	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
6B2---------- Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
6C2---------- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
7B---------- Colfax	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
7C---------- Colfax	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
8B---------- Creedmoor	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8B2, 8C, 8C2------- Creedmoor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
9B---------- Enon	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
9C2---------- Enon	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
11B2---------- Fluvanna	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
11C2---------- Fluvanna	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
12---------- Forestdale	Fair	Fair	Good	Fair	---	Good	Good	Fair	Fair	Good.
13A---------- Fork Variant	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
14B2, 14C2--------- Georgeville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
15B2---------- Hiwassee	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
16B2---------- Louisburg	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
16C2---------- Louisburg	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
16D2, 16E2---------- Louisburg	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
17B2---------- Madison	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
17C2---------- Madison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
17D2---------- Madison	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
18B3---------- Madison	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
18C3---------- Madison	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
18D3---------- Madison	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
19E3*:										
Madison----------	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
Pacolet----------	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Wedowee----------	Very poor.	Poor	Fair	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
21B---------- Masada	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
21C---------- Masada	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
22B---------- Mayodan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
22C2---------- Mayodan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
23, 24*---------- Monacan	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
25B2---------- Nason	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
25C2---------- Nason	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
25D2---------- Nason-	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
26B---------- Orange	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
26C---------- Orange	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
27B2, 27C2--------- Pacolet	Fair	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
27D2---------- Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
28B3, 28C3--------- Pacolet	Poor	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
28D3--------------- Pacolet	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
29A---------------- Pamunkey	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
31C2--------------- Pinkston	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
31E2--------------- Pinkston	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
32D2*: Pinkston----------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Mayodan-----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
33----------------- Roanoke	Poor	Poor	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
34B---------------- Sedgefield	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
34C---------------- Sedgefield	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
35C2--------------- Tallapoosa Variant	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
35D2--------------- Tallapoosa Variant	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
35E2--------------- Tallapoosa Variant	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
36B2--------------- Tatum	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
36C2--------------- Tatum	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
36D2--------------- Tatum	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
37*---------------- Tuckahoe	Fair	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
38B2--------------- Turbeville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
38C2--------------- Turbeville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
39B3--------------- Turbeville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
39C3--------------- Turbeville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
41*, 42*. Udorthents										

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
43B---------- Vance	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
43C2---------- Vance	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
44B2---------- Wedowee	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
44C2---------- Wedowee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
44D2---------- Wedowee	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
45B3, 45C3--------- Wedowee	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
45D3---------- Wedowee	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
46---------- Wehadkee	Very poor.	Poor	Poor	Fair	Fair	Good	Fair	Poor	Fair	Fair.
47B2---------- Wilkes	Poor	Poor	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
47C2, 47D2--------- Wilkes	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
47E2---------- Wilkes	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

* See the map unit description for the composition and behavior of the unit.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means greater than. Absence of an entry means data were not estimated. NP means nonplastic]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
2B---------- Appling	0-9	Fine sandy loam	SM, SM-SC	A-2, A-4	0	85-100	80-100	55-75	30-50	<27	NP-5
	9-48	Sandy clay, clay loam, clay.	MH, CL, ML, SC	A-7	0	95-100	95-100	70-90	50-80	41-74	15-30
	48-63	Loam, silty clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0	95-100	95-100	70-90	40-75	25-45	8-22
3A*, 3B*---------- Bolling	0-11	Silt loam-------	ML, CL, SM, SC	A-4	0	100	100	60-95	35-85	<30	NP-10
	11-35	Clay loam, sandy clay loam, silty clay loam.	CL, SC	A-6, A-7	0	100	100	80-95	40-85	30-45	11-20
	35-63	Sandy clay loam, silty clay loam, clay.	CL, CH, SC	A-6, A-7	0	100	100	80-100	40-90	30-60	11-35
4B---------- Bourne	0-12	Fine sandy loam	ML, SM, SM-SC, CL-ML	A-4	0	100	100	70-85	35-55	<25	NP-6
	12-28	Sandy clay loam, clay loam, loam.	SC, CL	A-2, A-6, A-7	0-5	80-100	70-100	60-95	30-80	30-50	10-25
	28-52	Loam, sandy clay loam, fine sandy loam.	SC, CL, SM-SC	A-4, A-6	0	100	95-100	70-95	40-80	20-40	5-20
	52-82	Variable--------	---	---	---	---	---	---	---	---	---
5---------- Buncombe	0-7	Loamy fine sand	SM	A-2, A-4	0	98-100	98-100	60-85	30-45	---	NP
	7-65	Loamy fine sand	SM	A-2, A-4	0	98-100	98-100	60-85	30-45	---	NP
6B2, 6C2---------- Cecil	0-9	Fine sandy loam	SM, SM-SC	A-2, A-4	0	85-100	80-100	70-90	25-45	<30	NP-6
	9-51	Clay----------	MH, ML	A-7	0	95-100	90-100	70-99	55-95	41-80	9-37
	51-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
7B---------- Colfax	0-10	Fine sandy loam	ML, SM, CL-ML, SM-SC	A-4	0	95-100	90-100	60-90	40-60	<25	NP-7
	10-21	Clay loam-------	SC, CL	A-4, A-6	0	90-100	85-100	75-90	40-80	25-40	7-15
	21-44	Sandy loam, fine sandy loam, clay loam.	ML, CL, SM, SC	A-2, A-4	0	95-100	90-100	60-90	30-70	<30	NP-10
	44-64	Weathered bedrock.	---	---	---	---	---	---	---	---	---
7C---------- Colfax	0-10	Fine sandy loam	ML, SM, CL-ML, SM-SC	A-4	0	95-100	90-100	60-90	40-60	<25	NP-7
	10-21	Clay loam-------	SC, CL	A-4, A-6	0	90-100	85-100	75-90	40-80	25-40	7-15
	21-44	Sandy loam, fine sandy loam, clay loam.	ML, CL, SM, SC	A-2, A-4	0	95-100	90-100	60-90	30-70	<30	NP-10
	44-64	Weathered bedrock.	---	---	---	---	---	---	---	---	---
8B, 8B2, 8C, 8C2--- Creedmoor	0-6	Fine sandy loam	SM	A-4, A-2	0	100	100	70-85	30-45	---	NP
	6-9	Sandy clay loam	MH, CH	A-7	0	100	100	85-95	70-80	60-70	30-40
	9-42	Clay, silty clay	MH, CH	A-7	0	100	100	95-100	75-90	61-79	32-49
	42-66	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
9B, 9C2---------- Enon	0-9	Fine sandy loam	SM, SM-SC, SC	A-4, A-6	0	95-100	95-100	60-85	35-50	<30	NP-15
	9-30	Clay loam, clay	CH	A-7-6	0	85-100	80-100	75-95	65-95	51-75	25-45
	30-52	Weathered bedrock.	---	---	---	---	---	---	---	---	---
11B2, 11C2--------- Fluvanna	0-11	Fine sandy loam	SM, SC, ML, CL	A-2, A-4, A-6	0	85-100	80-100	55-100	30-90	16-40	NP-16
	11-45	Clay, silty clay, silty clay loam.	MH	A-7	0	95-100	95-100	85-100	70-95	60-95	25-50
	45-84	Clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	85-100	65-95	32-46	14-22
12---------- Forestdale	0-5	Fine sandy loam	SM	A-4	0	100	100	95-100	40-50	<25	NP
	5-35	Sandy clay, clay, clay loam.	CH, CL, MH, SC	A-7	0-5	95-100	95-100	95-100	40-100	40-65	20-40
	35-70	Sandy clay, clay loam, sandy loam.	CL, ML, SM-SC	A-6, A-7, A-4	0	95-100	95-100	60-100	35-75	20-50	5-30
13A---------- Fork Variant	0-10	Silt loam-------	ML, CL	A-4	0	95-100	95-100	80-95	70-85	<30	NP-10
	10-36	Clay loam, silty clay loam.	CL, CH	A-6, A-7	0	95-100	95-100	75-95	65-95	35-60	15-30
	36-46	Silty clay------	MH	A-7	0	95-100	95-100	85-100	80-95	55-75	15-30
	46-80	Sandy clay loam, silty clay loam.	MH	A-7	0	95-100	95-100	80-100	35-95	55-70	15-30
14B2, 14C2--------- Georgeville	0-4	Loam----------	ML, CL-ML	A-4	0	95-100	95-100	65-100	50-95	<40	NP-10
	4-39	Clay, clay loam	MH, ML	A-7-5	0	95-100	95-100	90-100	75-95	41-75	15-35
	39-52	Silty clay loam	MH	A-7-5	0	95-100	90-100	65-100	60-95	50-75	15-35
	52-96	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4	0	90-100	90-100	65-100	60-95	<30	NP-10
15B2---------- Hiwassee	0-8	Loam----------	CL, ML, CL-ML	A-7-6, A-6, A-4	0	95-100	95-100	90-100	50-85	25-50	5-23
	7-75	Clay, clay loam	CL, ML, MH	A-7-5, A-7-6, A-6	0-2	95-100	95-100	80-100	70-95	36-52	12-20
16B2, 16C2, 16D2, 16E2---------- Louisburg	0-8	Fine sandy loam	SM, SM-SC	A-2	0-15	85-100	85-100	50-80	25-35	<30	NP-6
	8-48	Fine sandy loam, sandy loam.	SM, SM-SC	A-2, A-4	0-15	95-100	75-100	55-80	25-40	<40	NP-7
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
17B2, 17C2, 17D2--- Madison	0-6	Fine sandy loam	SM	A-2, A-4	0	85-100	80-100	60-90	25-50	<35	NP-8
	6-30	Clay, clay loam	MH, ML	A-7	0	90-100	85-100	75-100	55-85	43-82	12-43
	30-96	Loam----------	CL-ML, ML	A-4, A-5	0	85-100	85-100	75-95	50-75	<50	NP-6
18B3, 18C3, 18D3--- Madison	0-6	Clay loam-------	CL	A-6	0	90-100	85-100	70-95	50-80	20-40	10-20
	6-30	Clay, clay loam	MH, ML	A-7	0	90-100	85-100	75-100	55-85	43-82	12-43
	30-96	Loam----------	CL-ML, ML	A-4, A-5	0	85-100	85-100	75-95	50-75	<50	NP-6
19E3*: Madison----------	0-6	Clay loam-------	CL	A-6	0	90-100	85-100	70-95	50-80	20-40	10-20
	6-30	Clay, clay loam	MH, ML	A-7	0	90-100	85-100	75-100	55-85	43-82	12-43
	30-96	Loam----------	CL-ML, ML	A-4, A-5	0	85-100	85-100	75-95	50-75	<50	NP-6

See footnote at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
19E3*:											
Pacolet	0-4	Clay loam	SM-SC, SC	A-4, A-6	0	95-100	90-100	65-85	35-50	20-40	4-17
	4-42	Sandy clay loam, clay loam, clay.	ML, MH	A-6, A-7	0	80-100	80-100	60-95	50-75	38-65	11-30
	42-62	Loam, sandy loam	CL-ML, SM-SC	A-4	0	90-100	90-100	55-85	35-65	<25	NP-5
Wedowee	0-5	Clay loam	SC, CL	A-4, A-6	0	75-100	75-100	80-95	45-75	<32	7-15
	5-37	Sandy clay, sandy clay loam, clay.	SC, ML, CL, SM	A-4, A-6, A-7, A-2	0	75-100	75-100	65-75	25-70	30-58	8-25
	37-62	Clay loam, sandy loam, sandy clay loam, loam.	CL, SC, CL-ML, SM-SC	A-4, A-6	0	95-100	95-100	55-95	35-75	25-35	5-15
21B, 21C	0-14	Fine sandy loam	SM, SC	A-2, A-4	0-20	90-100	90-100	55-85	30-50	<30	NP-8
Masada	14-60	Clay, sandy clay	MH, CH, CL	A-7	0-20	90-100	90-100	75-95	50-95	45-65	16-35
22B, 22C2	0-7	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0	100	100	60-75	30-65	<36	NP-5
Mayodan	7-45	Clay, clay loam, sandy clay loam.	MH, CH, SM	A-7	0	95-100	95-100	95-100	40-90	60-80	28-40
	45-63	Loam, fine sandy loam, clay loam.	CL, SC	A-6	0	100	100	70-100	40-80	<30	7-15
23, 24*	0-12	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	100	80-95	55-85	<35	NP-15
Monacan	12-42	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	100	90-100	70-95	25-40	7-20
	42-63	Variable	---	---	---	---	---	---	---	---	---
25B2, 25C2, 25D2	0-6	Loam	ML, CL, CL-ML, SM	A-4	0	80-100	75-100	55-95	35-85	<38	NP-10
Nason	6-85	Silty clay loam, silty clay, clay, clay loam.	CL, CH	A-7	0	80-100	75-100	70-95	65-90	40-60	15-30
	85-99	Silt loam	CL, CL-ML	A-4, A-6	0	80-80	75-75	65-75	55-70	20-35	4-12
26B, 26C	0-10	Loam	SM, ML, CL-ML, SM-SC	A-4	0	90-95	85-95	75-95	45-85	<24	NP-6
Orange	10-51	Clay, sandy clay, sandy clay loam.	CH, CL, SC	A-7	0	90-95	85-95	75-95	40-90	45-99	30-70
	51-65	Variable	---	---	---	---	---	---	---	---	---
27B2, 27C2, 27D2	0-4	Fine sandy loam	SM, SM-SC	A-2	0	85-100	80-100	60-80	20-35	<36	NP-10
Pacolet	4-42	Sandy clay loam, clay loam, clay.	ML, MH	A-6, A-7	0	80-100	80-100	60-95	50-75	38-65	11-30
	42-62	Loam, sandy loam	CL-ML, SM-SC	A-4	0	90-100	90-100	55-85	35-65	<25	NP-5
28B3, 28C3, 28D3	0-4	Clay loam	SM-SC, SC	A-4, A-6	0	95-100	90-100	65-85	35-50	20-40	4-17
Pacolet	4-42	Sandy clay loam, clay loam, clay.	ML, MH	A-6, A-7	0	80-100	80-100	60-95	50-75	38-65	11-30
	42-62	Loam, sandy loam	CL-ML, SM-SC	A-4	0	90-100	90-100	55-85	35-65	<25	NP-5

See footnote at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
29A---------- Pamunkey	0-9	Loam----------	ML, CL, CL-ML	A-4	0	95-100	95-100	65-95	50-85	18-30	2-10
	9-72	Silty clay loam, clay loam.	CL	A-6	0	95-100	95-100	70-95	65-90	30-40	10-20
31C2, 31E2---------- Pinkston	0-7	Fine sandy loam	CL, ML, SM, SC	A-4	0	95-100	95-100	45-95	40-55	<30	NP-10
	7-35	Loam, sandy loam	SC, CL	A-2, A-4	0	95-100	95-100	35-95	20-75	<25	NP-7
	35-40	Weathered bedrock.	---	---	---	---	---	---	---	---	---
32D2*:											
Pinkston----------	0-7	Fine sandy loam	CL, ML, SM, SC	A-4	0	95-100	95-100	45-95	40-55	<30	NP-10
	7-35	Loam, sandy loam.	SC, CL	A-2, A-4	0	95-100	95-100	35-95	20-75	20-40	NP-7
	35-40	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Mayodan----------	0-7	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0	100	100	60-75	30-65	<36	NP-5
	7-45	Clay, clay loam, sandy clay loam.	MH, CH, SM	A-7	0	95-100	95-100	95-100	40-90	60-80	28-40
	45-63	Loam, fine sandy loam, clay loam.	CL, SC	A-6	0	100	100	70-100	40-80	<30	7-15
33---------- Roanoke	0-9	Silt loam--------	CL-ML, CL	A-6, A-4	0	100	100	90-100	70-90	25-40	5-16
	9-50	Clay, silty clay, clay loam.	CH, CL	A-7	0	100	100	85-100	65-95	45-60	22-36
	50-70	Variable--------	---	---	---	---	---	---	---	---	---
34B, 34C---------- Sedgefield	0-11	Fine sandy loam	SM, SM-SC	A-4	0	100	100	70-85	40-50	<25	NP-7
	11-41	Sandy clay, sandy clay loam, clay.	CL, CH, SC	A-7	0	95-100	95-100	75-90	40-85	45-80	25-48
	41-45	Clay loam--------	CL	A-4, A-6, A-7	0	100	100	80-90	70-80	20-45	8-25
	45-72	Loam, fine sandy loam.	CL-ML, SM-SC	A-4	0	100	100	70-95	40-75	<25	NP-7
35C2, 35D2, 35E2--- Tallapoosa Variant	0-2	Fine sandy loam	SM	A-4, A-5	0-5	80-95	80-95	60-80	40-50	38-48	1-9
	2-15	Clay loam, loam, sandy clay loam.	CL, ML	A-4, A-6	0-15	85-95	80-95	70-95	50-75	30-39	6-14
	15-72	Loam, sandy loam	ML, SM	A-2, A-4	0-15	85-95	80-90	50-85	30-65	<36	NP-6
36B2, 36C2, 36D2--- Tatum	0-4	Loam----------	ML, CL, SM	A-4	0	80-100	75-100	65-100	40-90	20-34	NP-10
	4-32	Silty clay loam, silty clay, clay.	MH, CH	A-7	0	75-100	70-100	60-100	55-95	50-66	10-36
	32-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
37*---------- Tuckahoe	0-10	Loam----------	ML, CL-ML, SM, SM-SC	A-4	0	95-100	95-100	70-95	40-90	<35	NP-7
	10-61	Loam, silty clay loam.	CL	A-4, A-6	0	95-100	95-100	80-95	60-85	25-40	7-20
	61-68	Variable--------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
38B2, 38C2--------- Turbeville	0-10	Fine sandy loam	ML, SM, CL-ML	A-2, A-4	0	75-100	70-100	50-90	30-75	<28	NP-7
	10-99	Clay, clay loam, sandy clay.	CL, MH, CH	A-7	0	70-100	65-100	60-100	55-95	45-65	16-35
39B3, 39C3--------- Turbeville	0-10	Sandy clay loam	CL, SC	A-2, A-4, A-6, A-7	0	80-100	75-100	60-95	30-70	30-45	8-20
	10-99	Clay, clay loam, sandy clay.	CL, MH, CH	A-7	0	70-100	65-100	60-100	55-95	45-65	16-35
41*, 42*. Udorthents											
43B, 43C2---------- Vance	0-13	Fine sandy loam	SM, SM-SC	A-2, A-4	0	90-100	80-100	55-80	15-40	<27	NP-5
	13-45	Clay loam, clay	CH, MH	A-7	0	95-100	90-100	75-95	65-80	51-80	25-48
	45-68	Clay loam, loam, fine sandy loam.	CL, SC, CL-ML, SM-SC	A-4, A-6	0	95-100	95-100	60-95	40-75	25-35	5-15
44B2, 44C2, 44D2--- Wedowee	0-5	Fine sandy loam	SM, SM-SC	A-4	0	75-100	75-100	60-85	30-50	<30	NP-6
	5-37	Sandy clay, sandy clay loam, clay.	SC, ML, CL, SM	A-4, A-6, A-7, A-2	0	75-100	75-100	65-75	25-70	30-58	8-25
	37-62	Clay loam, sandy loam, sandy clay loam, loam.	CL, SC, CL-ML, SM-SC	A-4, A-6	0	95-100	95-100	55-95	35-75	25-35	5-15
45B3, 45C3, 45D3--- Wedowee	0-5	Clay loam--------	SC, CL	A-4, A-6	0	75-100	75-100	80-95	45-75	<32	7-15
	5-37	Sandy clay, sandy clay loam, clay.	SC, ML, CL, SM	A-4, A-6, A-7, A-2	0	75-100	75-100	65-75	25-70	30-58	8-25
	37-62	Clay loam, sandy loam, sandy clay loam, loam.	CL, SC, CL-ML, SM-SC	A-4, A-6	0	95-100	95-100	55-95	35-75	25-35	5-15
46---------- Wehadkee	0-9	Silt loam--------	CL, MH, ML, CH	A-6, A-7	0	100	100	85-100	70-95	25-52	11-22
	9-30	Loam, silty clay loam, silt loam.	ML, CL	A-6, A-7	0	100	100	90-100	60-85	30-45	11-20
	30-62	Variable--------	---	---	---	---	---	---	---	---	---
47B2, 47C2, 47D2, 47E2---------- Wilkes	0-5	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-2, A-4	0-10	90-100	80-100	60-90	25-55	<35	NP-7
	5-20	Clay loam, clay, loam.	CL, CH, MH, ML	A-6, A-7	0-10	80-100	80-100	75-95	50-80	30-60	11-32
	20-35	Weathered bedrock.	---	---	---	---	---	---	---	---	---

* See the map unit description for the composition and behavior of the unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means greater than. The erosion tolerance factor (T) is for the entire profile. Absence of an entry means data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
2B	0-9	2.0-6.0	0.10-0.15	4.5-5.5	Low	0.24	4
Appling	9-48	0.6-2.0	0.15-0.17	4.5-5.5	Moderate	0.20	
	48-63	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.24	
3A*, 3B*	0-11	0.6-6.0	0.10-0.20	4.5-7.3	Low	0.28	4
Bolling	11-35	0.6-2.0	0.13-0.19	4.5-7.3	Moderate	0.28	
	35-63	0.6-2.0	0.10-0.19	5.6-7.3	Moderate	0.28	
4B	0-12	2.0-6.0	0.08-0.15	4.5-6.5	Low	0.43	3
Bourne	12-28	0.6-2.0	0.11-0.16	3.6-5.5	Low	0.43	
	28-52	<0.2	0.08-0.12	3.6-5.5	Low	0.43	
	52-82	---	---	---	---	---	
5	0-7	>6.0	0.06-0.10	6.1-6.5	Low	0.10	5
Buncombe	7-65	>6.0	0.03-0.07	4.5-6.0	Low	0.10	
6B2, 6C2	0-9	2.0-6.0	0.12-0.14	4.5-6.0	Low	0.28	3
Cecil	9-51	0.6-2.0	0.13-0.15	4.5-5.5	Moderate	0.28	
	51-60	---	---	---	---	---	
7B, 7C	0-10	0.6-6.0	0.10-0.18	4.5-5.5	Low	0.37	4
Colfax	10-21	0.6-2.0	0.13-0.18	4.5-5.5	Moderate	0.37	
	21-44	0.06-0.2	0.06-0.10	4.5-5.5	Low	0.43	
	44-64	---	---	---	---	---	
8B, 8B2, 8C, 8C2-	0-6	2.0-6.0	0.10-0.14	3.6-5.5	Low	0.37	3
Creedmoor	6-9	0.2-0.6	0.13-0.15	3.6-5.5	Moderate	0.32	
	9-42	<0.06	0.13-0.15	3.6-5.5	High	0.32	
	42-66	---	---	---	---	---	
9B, 9C2	0-9	2.0-6.0	0.11-0.15	5.1-6.5	Low	0.37	4
Enon	9-30	0.06-0.2	0.15-0.20	5.1-7.8	High	0.32	
	30-52	---	---	---	---	---	
11B2, 11C2	0-11	2.0-6.0	0.10-0.15	4.5-5.5	Low	0.32	3
Fluvanna	11-45	0.06-0.6	0.10-0.17	4.5-5.5	Moderate	0.43	
	45-84	0.06-0.6	0.05-0.09	4.5-5.5	Moderate	0.28	
12	0-5	0.2-0.6	0.10-0.15	4.5-6.0	Low	0.43	3
Forestdale	5-35	<.06	0.14-0.18	4.5-6.0	High	0.28	
	35-70	0.2-0.6	0.10-0.19	4.5-6.0	Moderate	0.28	
13A	0-10	2.0-6.0	0.10-0.20	4.5-5.5	Low	0.43	2
Fork Variant	10-36	0.6-2.0	0.16-0.19	4.5-5.5	Moderate	0.43	
	36-46	0.2-0.6	0.16-0.20	5.1-7.3	Moderate	0.43	
	46-80	0.2-0.6	0.16-0.21	5.1-7.3	Moderate	0.43	
14B2, 14C2	0-4	0.6-2.0	0.15-0.20	4.5-6.0	Low	0.43	3
Georgeville	4-39	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.37	
	39-52	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.43	
	52-96	0.6-2.0	0.05-0.10	4.5-5.5	Low	0.43	
15B2	0-8	0.6-2.0	0.12-0.15	4.5-6.5	Low	0.28	4
Hiwassee	7-75	0.6-2.0	0.12-0.15	4.5-6.5	Low	0.28	
16B2, 16C2, 16D2, 16E2	0-8	6.0-20	0.09-0.12	4.5-6.0	Very low	0.24	2
Louisburg	8-18	6.0-20	0.10-0.12	4.5-6.0	Very low	0.24	
	18-48	---	---	---	---	---	
17B2, 17C2, 17D2-	0-6	2.0-6.0	0.11-0.15	4.5-6.0	Low	0.32	4
Madison	6-30	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.32	
	30-96	0.6-6.0	0.14-0.17	4.5-5.5	Low	0.43	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
18B3, 18C3, 18D3- Madison	0-6 6-30 30-96	0.6-2.0 0.6-2.0 0.6-6.0	0.12-0.16 0.13-0.18 0.14-0.17	4.5-6.0 4.5-5.5 4.5-5.5	Low Low Low	0.28 0.32 0.43	3
19E3*: Madison	0-6 6-30 30-96	0.6-2.0 0.6-2.0 0.6-6.0	0.12-0.16 0.13-0.18 0.14-0.17	4.5-6.0 4.5-5.5 4.5-5.5	Low Low Low	0.28 0.32 0.43	3
Pacolet	0-4 4-42 42-62	0.6-2.0 0.6-2.0 2.0-6.0	0.10-0.14 0.12-0.15 0.08-0.17	4.5-5.5 4.5-5.5 4.5-5.0	Low Low Low	0.24 0.28 0.17	2
Wedowee	0-5 5-37 37-62	0.6-2.0 0.2-0.6 0.6-6.0	0.12-0.18 0.12-0.18 0.08-0.19	4.5-5.5 4.5-5.5 4.5-5.0	Low Moderate Low	0.28 0.28 0.17	2
21B, 21C Masada	0-14 14-60	2.0-6.0 0.6-2.0	0.10-0.17 0.10-0.17	4.5-5.5 4.5-5.5	Low Moderate	0.32 0.28	4
22B, 22C2 Mayodan	0-7 7-45 45-63	>6.0 0.6-2.0 0.6-2.0	0.11-0.17 0.12-0.18 0.10-0.19	4.5-6.0 4.5-5.5 4.5-5.5	Low Low Low	0.24 0.24 0.17	3
23, 24* Monacan	0-12 12-42 42-63	0.6-2.0 0.6-2.0 ---	0.14-0.20 0.14-0.20 ---	5.1-7.3 5.1-7.3 ---	Low Low ---	0.28 0.28 ---	4
25B2, 25C2, 25D2- Nason	0-6 6-85 85-99	0.6-2.0 0.6-2.0 0.6-2.0	0.14-0.20 0.12-0.19 0.15-0.20	4.5-6.5 4.5-5.5 4.5-5.5	Low Moderate Low	0.32 0.28 0.43	4
26B, 26C Orange	0-10 10-51 51-65	0.6-2.0 0.06-0.2 0.2-0.6	0.14-0.20 0.10-0.16 ---	5.1-6.5 5.1-6.5 5.6-7.8	Low High ---	0.49 0.28 ---	2
27B2, 27C2, 27D2- Pacolet	0-4 4-42 42-62	2.0-6.0 0.6-2.0 2.0-6.0	0.08-0.12 0.12-0.15 0.08-0.17	4.5-5.5 4.5-5.5 4.4-5.5	Low Low Low	0.20 0.28 0.17	3
28B3, 28C3, 28D3- Pacolet	0-4 4-42 42-62	0.6-2.0 0.6-2.0 2.0-6.0	0.10-0.14 0.12-0.15 0.08-0.17	4.5-5.5 4.5-5.5 4.4-5.5	Low Low Low	0.24 0.28 0.17	2
29A Pamunkey	0-9 9-72	0.6-2.0 0.6-2.0	0.14-0.20 0.13-0.19	5.1-7.3 5.1-7.3	Low Low	0.28 0.28	4
31C2, 31E2 Pinkston	0-7 7-35 35-40	0.6-6.0 2.0-6.0 ---	0.08-0.18 0.06-0.18 ---	4.5-6.5 4.5-5.5 ---	Low Low ---	0.43 0.43 ---	2
32D2*: Pinkston	0-7 7-35 35-40	0.6-6.0 2.0-6.0 ---	0.08-0.18 0.06-0.18 ---	4.5-6.5 4.5-5.5 ---	Low Low ---	0.43 0.43 ---	2
Mayodan	0-7 7-45 45-63	>6.0 0.6-2.0 0.6-2.0	0.11-0.17 0.12-0.18 0.10-0.19	4.5-6.0 4.5-5.5 4.5-5.5	Low Low Low	0.24 0.24 0.17	3
33 Roanoke	0-9 9-50 50-70	0.6-2.0 0.06-0.2 ---	0.14-0.20 0.10-0.19 ---	4.5-5.5 4.5-5.5 ---	Low Moderate ---	--- --- ---	---
34B, 34C Sedgefield	0-11 11-41 41-45 45-72	2.0-6.0 0.06-0.2 0.6-2.0 0.6-2.0	0.10-0.14 0.14-0.18 0.12-0.15 0.08-0.17	4.5-6.0 4.5-6.0 5.6-6.0 5.1-5.5	Low High Moderate Low	0.37 0.32 0.32 0.32	3

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
35C2, 35D2, 35E2- Tallapoosa Variant	0-2 2-15 15-72	0.6-6.0 0.6-2.0 0.6-6.0	0.10-0.15 0.13-0.19 0.08-0.17	4.5-5.5 4.5-5.5 4.5-5.5	Low Low Low	0.28 0.28 0.43	1
36B2, 36C2, 36D2- Tatum	0-4 4-32 32-60	0.6-2.0 0.6-2.0 ---	0.14-0.20 0.10-0.19 ---	4.5-5.5 4.5-5.5 ---	Low Moderate ---	0.37 0.28 0.47	4
37* Tuckahoe	0-10 10-61 61-68	0.6-6.0 0.6-2.0 ---	0.10-0.20 0.14-0.19 ---	5.6-7.3 5.6-7.3 ---	Low Low ---	0.28 0.28 ---	4
38B2, 38C2 Turbeville	0-10 10-99	2.0-6.0 0.6-2.0	0.10-0.17 0.13-0.16	4.5-5.5 4.5-5.5	Low Moderate	0.32 0.28	3
39B3, 39C3 Turbeville	0-10 10-99	0.6-6.0 0.6-2.0	0.13-0.19 0.13-0.16	4.5-5.5 4.5-5.5	Moderate Moderate	0.32 0.28	2
41*, 42*. Udorthents							
43B, 43C2 Vance	0-13 13-45 45-68	2.0-6.0 0.06-0.2 0.2-2.0	0.10-0.14 0.12-0.15 0.08-0.19	4.5-6.0 4.5-5.5 4.5-5.0	Low Moderate Low	0.28 0.37 0.28	3
44B2, 44C2, 44D2- Wedowee	0-5 5-37 37-62	2.0-6.0 0.2-0.6 0.6-6.0	0.10-0.18 0.12-0.18 0.08-0.19	4.5-5.5 4.5-5.5 4.5-5.0	Low Moderate Low	0.24 0.28 0.17	2
45B3, 45C3, 45D3- Wedowee	0-5 5-37 37-62	0.6-2.0 0.2-0.6 0.6-6.0	0.12-0.18 0.12-0.18 0.08-0.19	4.5-5.5 4.5-5.5 4.5-5.0	Low Moderate Low	0.28 0.28 0.17	2
46 Wehadkee	0-9 9-30 30-62	2.0-6.0 0.6-2.0 ---	0.14-0.18 0.16-0.20 ---	4.5-6.5 4.5-6.5 ---	Low Low ---	0.24 0.32 ---	---
47B2, 47C2, 47D2, 47E2 Wilkes	0-5 5-20 20-35	2.0-6.0 0.2-0.6 ---	0.11-0.15 0.15-0.20 ---	5.1-6.5 6.1-7.8 ---	Low Moderate ---	0.28 0.32 ---	2

* See the map unit description for the composition and behavior of the unit.

TABLE 15.--SOIL AND WATER FEATURES

[Absence of an entry indicates the feature is not a concern. The Glossary defines terms used to describe "Flooding" and "High water table. "See the text for descriptions of symbols and such terms as "rare," "brief," and "perched." The symbol < means less than; > means greater than]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
2B---------- Appling	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
3A*, 3B*---------- Bolling	C	Occasional	Very brief	Mar-Jul	1.5-2.5	Apparent	Dec-Mar	>60	---	Moderate	High.
4B---------- Bourne	C	None--------	---	---	1.5-2.5	Perched	Dec-May	>60	---	High-----	High.
5---------- Buncombe	A	Frequent----	Very brief	Feb-Jun	>6.0	---	---	>60	---	Low------	Moderate.
6B2, 6C2---------- Cecil	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
7B, 7C---------- Colfax	C	None--------	---	---	1.0-1.5	Perched	Nov-Jun	>48	Rippable	High-----	High.
8B, 8B2, 8C, 8C2-- Creedmoor	C	None--------	---	---	1.0-2.0	Perched	Jan-Mar	>60	---	High-----	High.
9B, 9C2---------- Enon	C	None--------	---	---	---	---	---	>60	---	High-----	Moderate.
11B2, 11C2-------- Fluvanna	C	None--------	---	---	4.0-6.0	Apparent	Dec-May	>60	---	High-----	High.
12---------- Forestdale	D	None--------	---	---	0.5	Apparent	Jan-Mar	>60	---	High-----	Moderate.
13A---------- Fork Variant	C	Occasional	Very brief	Oct-Jun	1.0-2.0	Apparent	Dec-May	>60	---	High-----	High.
14B2, 14C2-------- Georgeville	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
15B2---------- Hiwassee	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
16B2, 16C2, 16D2, 16E2---------- Louisburg	B	None--------	---	---	>6.0	---	---	>36	Hard	Low------	Moderate.
17B2, 17C2, 17D2, 18B3, 18C3, 18D3- Madison	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
19E3*:											
Madison----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Pacolet----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Wedowee----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
21B, 21C---------- Masada	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
22B, 22C2--------- Mayodan	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
23, 24*---------- Monacan	C	Common------	Brief-----	Nov-May	0.5-2.0	Apparent	Nov-May	>60	---	Moderate	High.
25B2, 25C2, 25D2-- Nason	C	None--------	---	---	>6.0	Apparent	---	40-60	Rippable	Moderate	High.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
26B, 26C---------- Orange	D	None--------	---	---	1.0-3.0	Apparent	Dec-May	40-60	Hard	High-----	Moderate.
27B2, 27C2, 27D2, 28B3, 28C3, 28D3- Pacolet	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
29A---------- Pamunkey	B	Occasional	Brief-----	Jan-Jun	>6.0	---	---	>60	---	Moderate	Moderate.
31C2, 31E2-------- Pinkston	B	None--------	---	---	>6.0	---	---	30-50	Hard	Low------	High.
32D2*: Pinkston---------	B	None--------	---	---	>6.0	---	---	30-50	Hard	Low------	High.
Mayodan----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
33---------- Roanoke	D	Frequent----	Brief-----	Nov-Jun	0-1.0	Apparent	Nov-May	>60	---	High-----	High.
34B, 34C---------- Sedgefield	C	None--------	---	---	1.0-1.5	Perched	Jan-Mar	>48	Hard	High-----	Moderate.
35C2, 35D2, 35E2-- Tallapoosa Variant	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
36B2, 36C2, 36D2-- Tatum	C	None--------	---	---	>6.0	---	---	40-60	Ripable	High-----	High.
37*---------- Tuckahoe	B	Common------	Brief-----	Nov-May	>6.0	---	---	>60	---	Moderate	Moderate.
38B2, 38C2, 39B3, 39C3---------- Turbeville	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
41*, 42*. Udorthents											
43B, 43C2--------- Vance	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
44B2, 44C2, 44D2, 45B3, 45C3, 45D3- Wedowee	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
46---------- Wehadkee	D	Common------	Brief-----	Nov-Jun	0-2.5	Apparent	Nov-Jun	>60	---	High-----	Moderate.
47B2, 47C2, 47D2, 47E2---------- Wilkes	C	None--------	---	---	>6.0	---	---	20-48	Hard	Moderate	Moderate.

* See the map unit description for the composition and behavior of the unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics of this taxadjunct that are outside the range of the series]

Soil name	Family or higher taxonomic class
Appling	Clayey, kaolinitic, thermic Typic Hapludults
Bolling	Fine-loamy, mixed, thermic Aquic Hapludalfs
Bourne	Fine-loamy, mixed, thermic Typic Fragiudults
Buncombe	Mixed, thermic Typic Udipsamments
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Colfax	Fine-loamy, mixed, thermic Aquic Fragiudults
Creedmoor	Clayey, mixed, thermic Aquic Hapludults
Enon	Fine, mixed, thermic Ultic Hapludalfs
*Fluvanna	Clayey, mixed, thermic Typic Hapludults
*Forestdale	Fine, montmorillonitic, thermic Typic Ochraqualfs
Fork variant.	
Georgeville	Clayey, kaolinitic, thermic Typic Hapludults
Hiwassee	Clayey, kaolinitic, thermic Typic Rhodudults
Louisburg	Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts
Madison	Clayey, kaolinitic, thermic Typic Hapludults
Masada	Clayey, mixed, thermic Typic Hapludults
Mayodan	Clayey, kaolinitic, thermic Typic Hapludults
Monacan	Fine-loamy, mixed, thermic Fluvaquentic Eutrochrepts
Nason	Clayey, mixed, thermic Typic Hapludults
Orange	Fine, montmorillonitic, thermic Albaquic Hapludalfs
Pacolet	Clayey, kaolinitic, thermic Typic Hapludults
*Pamunkey	Fine-loamy, mixed, thermic Ultic Hapludalfs
Pinkston	Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts
Roanoke	Clayey, mixed, thermic Typic Ochraquults
*Sedgefield	Fine, mixed, thermic Aquultic Hapludalfs
Tallapoosa variant	Fine Loamy Mixed Thermic Typic Hapludult
Tatum	Clayey, mixed, thermic Typic Hapludults
Tuckahoe	Fine-loamy, mixed, thermic Dystric Fluventic Eutrochrepts
Turbeville	Clayey, mixed, thermic Typic Paleudults
Vance	Clayey, mixed, thermic Typic Hapludults
Wedowee	Clayey, kaolinitic, thermic Typic Hapludults
Wehadkee	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents
*Wilkes	Loamy, mixed, thermic, shallow Typic Hapludalfs

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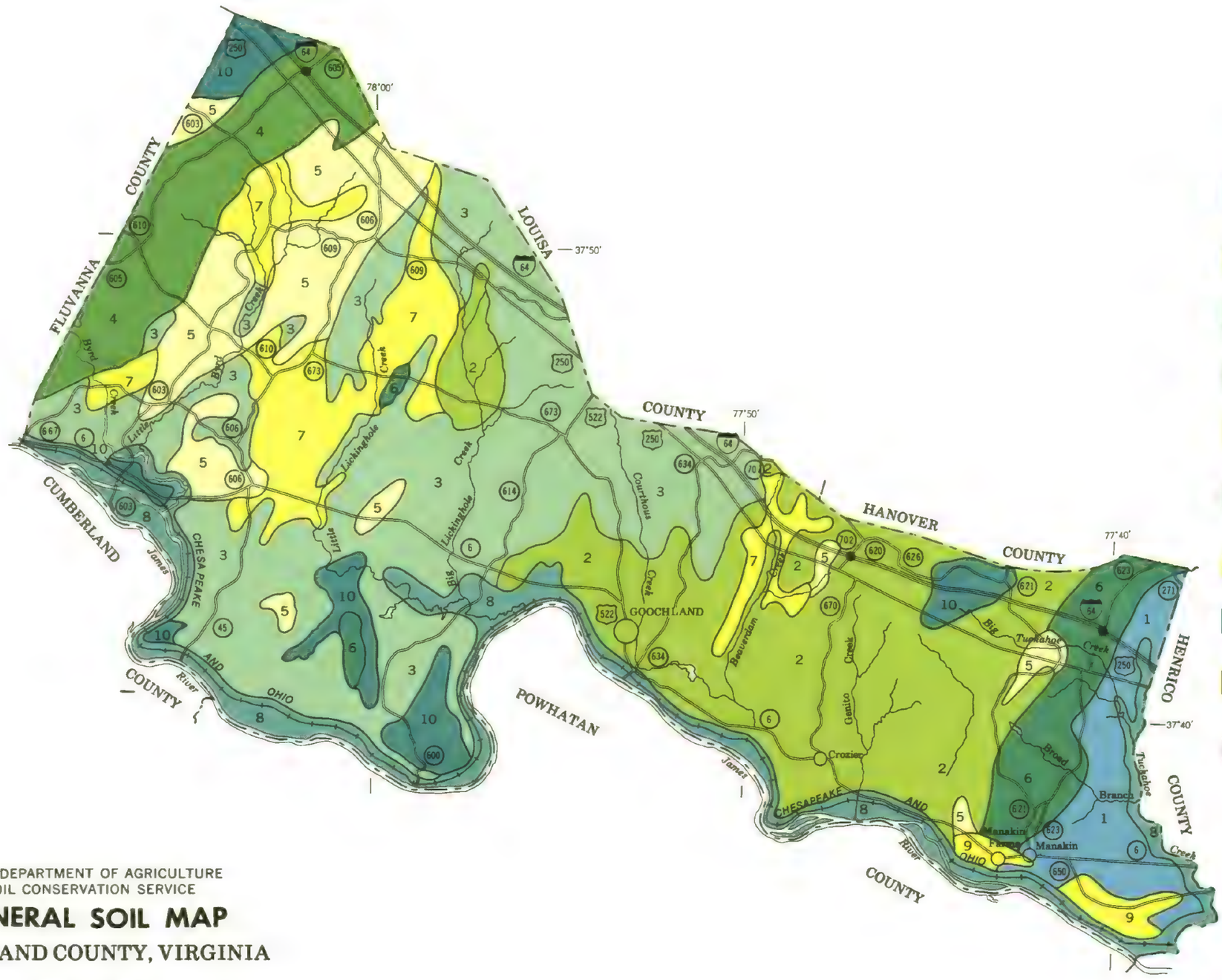


LEGEND

SOILS ON UPLANDS OF THE PIEDMONT PLATEAU THE SOILS IN THESE ASSOCIATIONS ARE ON UPLAND AREAS OF THE PIEDMONT PLATEAU THE SOILS HAVE FORMED MOSTLY IN RESIDIUM FROM METAMORPHIC ROCK

1. Creedmoor-Mayodan-Pinkston association: Deep and moderately deep, well drained and moderately well drained, gently sloping to steep soils that have a subsoil dominantly of clay or loam; on uplands
2. Madison-Pacolet association: Deep, well drained, gently sloping to moderately steep soils that have a subsoil dominantly of clay or clay loam; on uplands
3. Wedowee-Pacolet-Madison association: Deep, well drained, gently sloping to steep soils that have a subsoil dominantly of clay or clay loam; on uplands
4. Tatum-Nason association: Deep, well drained, gently sloping to moderately steep soils that have a subsoil dominantly of clay, silty clay, or silty clay loam; on uplands
5. Wedowee-Sedgefield -Vance association: Deep, well drained and moderately well drained, gently sloping to steep soils that have a subsoil dominantly of clay or sandy clay; on uplands
6. Fluvanna-Sedgefield-Georgeville association: Deep, well drained and moderately well drained, gently sloping and sloping soils that have a subsoil dominantly of clay or sandy clay; on uplands
7. Enon-Wilkes-Madison association: Deep and moderately deep, well drained, gently sloping to steep soils that have a subsoil dominantly of clay, clay loam, or loam; on uplands
8. Monacan-Tuckahoe association: Deep, well drained to somewhat poorly drained, nearly level soils that have a subsoil dominantly of silt loam, silty clay loam, loam, or clay loam; on flood plains
9. Masada Turbeville-Pinkston association: Deep and moderately deep, well drained to excessively drained, gently sloping to steep soils that have a subsoil dominantly of sandy clay, clay loam, or clay; on river terraces and uplands
10. Turbeville-Madison association: Deep, well drained, gently sloping to steep soils that have a subsoil dominantly of sandy clay, clay loam, or clay; on river terraces and uplands

Compiled 1978

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GENERAL SOIL MAP

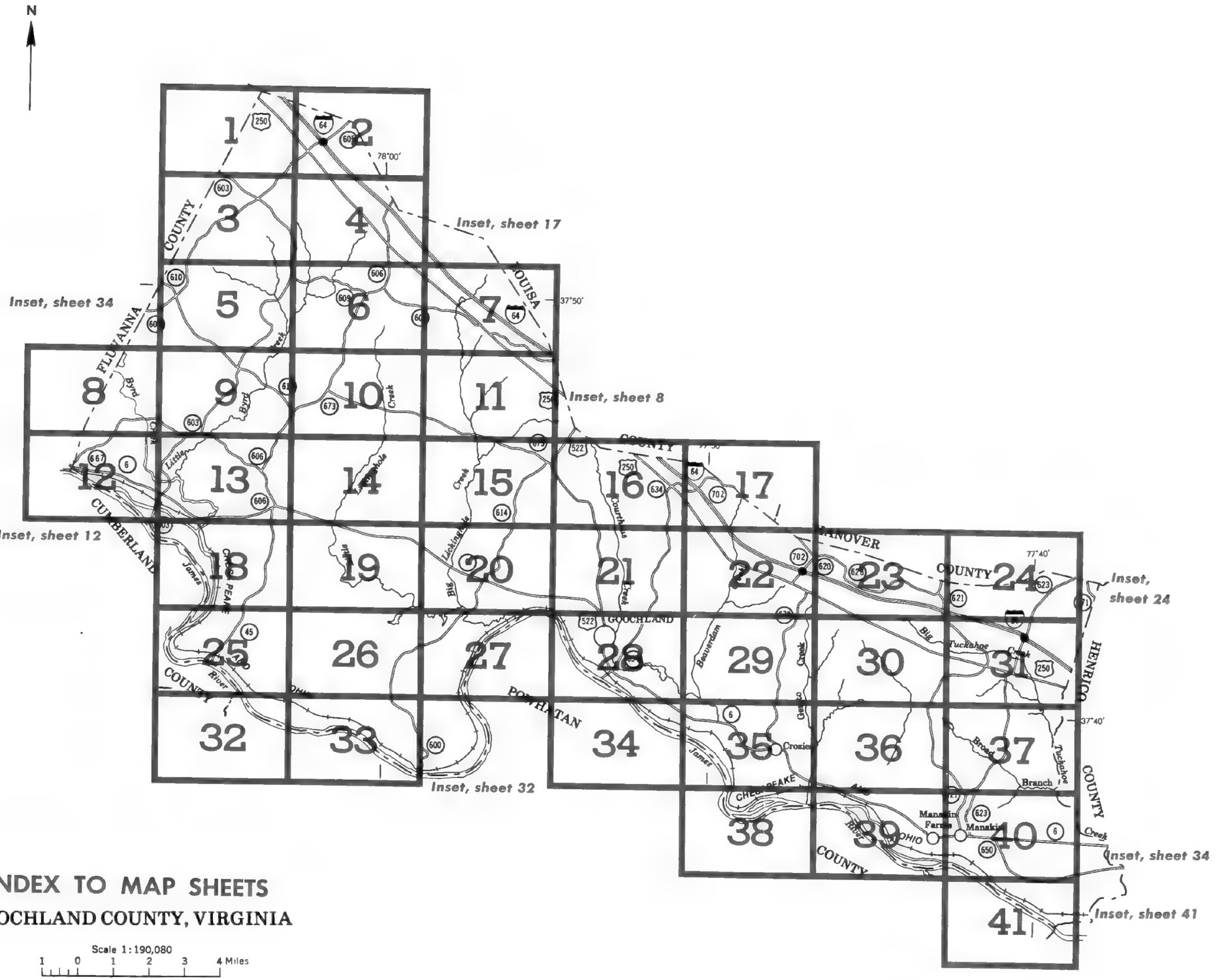
GOOCHLAND COUNTY, VIRGINIA

Scale 1:190,080

1 0 1 2 3 4 Miles

1 0 1 2 3 4 Kilometers

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS

GOOCHLAND COUNTY, VIRGINIA

Scale 1:190,080

1 0 1 2 3 4 Miles

3 Miles = 1"

1 0 1 2 3 4 Kilometers

SOIL LEGEND

Symbols consist of a numeral or numerals and a letter. For units that have slope as part of their name, the letter A, B, C, D, or E, shows the slope class. A final number, 2 or 3, following the slope class letter indicates that the soil is eroded or severely eroded.

SYMBOL	NAME
2B	Appling fine sandy loam, 2 to 7 percent slopes
3A	Bolling soils, 0 to 2 percent slopes
3B	Bolling soils, 2 to 7 percent slopes
4B	Bourne fine sandy loam, 2 to 7 percent slopes
5	Buncombe loamy fine sand
6B2	Cecil fine sandy loam, 2 to 7 percent slopes, eroded
6C2	Cecil fine sandy loam, 7 to 15 percent slopes, eroded
7B	Colfax fine sandy loam, 2 to 7 percent slopes
7C	Colfax fine sandy loam, 7 to 15 percent slopes
8B	Creedmoor fine sandy loam, 2 to 7 percent slopes
8B2	Creedmoor fine sandy loam, 2 to 7 percent slopes, eroded
8C	Creedmoor fine sandy loam, 7 to 15 percent slopes
8C2	Creedmoor fine sandy loam, 7 to 15 percent slopes, eroded
9B	Enon fine sandy loam, 2 to 7 percent slopes
9C2	Enon fine sandy loam, 7 to 15 percent slopes, eroded
11B2	Fluvanna fine sandy loam, 2 to 7 percent slopes, eroded
11C2	Fluvanna fine sandy loam, 7 to 15 percent slopes, eroded
12	Forestdale fine sandy loam
13A	Fork Variant soils, 0 to 2 percent slopes
14B2	Georgeville fine sandy loam, 2 to 7 percent slopes, eroded
14C2	Georgeville fine sandy loam, 7 to 15 percent slopes, eroded
15B2	Hiwassee loam, 2 to 7 percent slopes, eroded
16B2	Louisburg fine sandy loam, 2 to 7 percent slopes, eroded
16C2	Louisburg fine sandy loam, 7 to 15 percent slopes, eroded
16D2	Louisburg fine sandy loam, 15 to 25 percent slopes, eroded
16E2	Louisburg fine sandy loam, 25 to 45 percent slopes, eroded
17B2	Madison fine sandy loam, 2 to 7 percent slopes, eroded
17C2	Madison fine sandy loam, 7 to 15 percent slopes, eroded
17D2	Madison fine sandy loam, 15 to 25 percent slopes, eroded
18B3	Madison clay loam, 2 to 7 percent slopes, severely eroded
18C3	Madison clay loam, 7 to 15 percent slopes, severely eroded
18D3	Madison clay loam, 15 to 25 percent slopes, severely eroded
19E3	Madison, Pacolet and Wedowee clay loams, 25 to 45 percent slopes, severely eroded
21B	Masada fine sandy loam, 2 to 7 percent slopes
21C	Masada fine sandy loam, 7 to 15 percent slopes
22B	Mayodan fine sandy loam, 2 to 7 percent slopes
22C2	Mayodan fine sandy loam, 7 to 15 percent slopes, eroded
23	Monacan silt loam
24	Monacan complex
25B2	Nason loam, 2 to 7 percent slopes, eroded
25C2	Nason loam, 7 to 15 percent slopes, eroded
25D2	Nason loam, 15 to 25 percent slopes, eroded
26B	Orange loam, 2 to 7 percent slopes
26C	Orange loam, 7 to 15 percent slopes
27B2	Pacolet fine sandy loam, 2 to 7 percent slopes, eroded
27C2	Pacolet fine sandy loam, 7 to 15 percent slopes, eroded
27D2	Pacolet fine sandy loam, 15 to 25 percent slopes, eroded
28B3	Pacolet clay loam, 2 to 7 percent slopes, severely eroded
28C3	Pacolet clay loam, 7 to 15 percent slopes, severely eroded
28D3	Pacolet clay loam, 15 to 25 percent slopes, severely eroded
29A	Pamunkey loam, 0 to 4 percent slopes
31C2	Pinkston fine sandy loam, 7 to 15 percent slopes, eroded
31E2	Pinkston fine sandy loam, 25 to 45 percent slopes, eroded
32D2	Pinkston-Mayodan fine sandy loams, 15 to 25 percent slopes, eroded
33	Roanoke silt loam
34B	Sedgefield fine sandy loam, 2 to 7 percent slopes
34C	Sedgefiled fine sandy loam, 7 to 15 percent slopes
35C2	Tallapoosa Variant fine sandy loam, 7 to 15 percent slopes, eroded
35D2	Tallapoosa Variant fine sandy loam, 15 to 25 percent slopes, eroded
35E2	Tallapoosa Variant fine sandy loam, 25 to 50 percent slopes, eroded
36B2	Tatum loam, 2 to 7 percent slopes, eroded
36C2	Tatum loam, 7 to 15 percent slopes, eroded
36D2	Tatum loam, 15 to 25 percent slopes, eroded
37	Tuckahoe soils
38B2	Turbeville fine sandy loam, 2 to 7 percent slopes, eroded
38C2	Turbeville fine sandy loam, 7 to 15 percent slopes, eroded
39B3	Turbeville sandy clay loam, 2 to 7 percent slopes, severely eroded
39C3	Turbeville sandy clay loam, 7 to 15 percent slopes, severely eroded
41	Udorthents, mine spoil
42	Udorthents-Quarries complex
43B	Vance fine sandy loam, 2 to 7 percent slopes
43C2	Vance fine sandy loam, 7 to 15 percent slopes, eroded
44B2	Wedowee fine sandy loam, 2 to 7 percent slopes, eroded
44C2	Wedowee fine sandy loam, 7 to 15 percent slopes, eroded
44D2	Wedowee fine sandy loam, 15 to 25 percent slopes, eroded
45B3	Wedowee clay loam, 2 to 7 percent slopes, severely eroded
45C3	Wedowee clay loam, 7 to 15 percent slopes, severely eroded
45D3	Wedowee clay loam, 15 to 25 percent slopes, severely eroded
46	Wehadkee silt loam
47B2	Wilkes fine sandy loam, 2 to 7 percent slopes, eroded
47C2	Wilkes fine sandy loam, 7 to 15 percent slopes, eroded
47D2	Wilkes fine sandy loam, 15 to 25 percent slopes, eroded
47E2	Wilkes fine sandy loam, 25 to 45 percent slopes, eroded

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool (Davis Airstrip; FLOOD POOL LINE)

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate (78)
- Federal (410)
- State (52)
- County, farm or ranch (378)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small (water, w)

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (GAS)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) (CANAL)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial (water, w)
- Intermittent (int, i)

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (CeA, FoB2)

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot (0)
- Cut and fill areas up to 3 acres in size
- Possibility of subsoil significantly slower than surrounding area.

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 1

GOOCHLAND COUNTY, VIRGINIA NO. 1

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

2 115 000 FEET

570 000 FEET

LOUISA COUNTY

FLUVANNA COUNTY

Rivanna

Rockhouse Run

(Joins sheet 2)

(Joins sheet 3)

2 130 000 FEET

560 000 FEET

1

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

1 000 2 000 3 000 4 000 5 000

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 10

10

N

(Joins sheet 6)

2 135 000 FEET

530 000 FEET

(Joins sheet 9)

(Joins sheet 14)

(Joins sheet 11)

525 000 FEET

2 150 000 FEET

1 Mile

5 000 Feet

Scale 1:15 840

This map was compiled on 1975 aerial photography by the U. S. Department of Agriculture. Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately posit ioned

GOOCHLAND COUNTY, VIRGINIA NO. 10

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 11

GOOCHLAND COUNTY, VIRGINIA NO. 11

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

2 155 000 FEET

530 000 FEET

(Joins sheet 10)

(Joins sheet 7)

LOUISA COUNTY

Lickinghole Creek

Rivanna River

Creek

(Joins inset, sheet 8)

525 000 FEET

27D2

44D2

(Joins sheet 15)

2 170 000 FEET

11

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 12

12

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

(Joins sheet 8)

2 110 000 FEET

520 000 FEET

(Joins sheet 13)

2 095 000 FEET

510 000 FEET

(Joins inset)

FLUVANNA COUNTY

JAMES — CUMBERLAND COUNTY — RIVER

CHESAPEAKE AND OHIO

ELK ISLAND

Creek

(Joins lower right)

2 112 000 FEET

505 000 FEET

508 000 FEET

(Joins sheet 18)

2 110 000 FEET

2000 AND 3000-FOOT GRID TICKS

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

GOOCHLAND COUNTY, VIRGINIA NO. 12

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 13

GOOCHLAND COUNTY, VIRGINIA NO. 13

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners if shown are approximately positioned.

2 115 000 FEET

520 000 FEET

(Joins sheet 12)

(Joins sheet 9)

(Joins sheet 14)

2 130 000 FEET (Joins sheet 18)

13

N

1 Mile

5000 Feet

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

Burd Creek

White Oak Creek

Fife

George Tavern

CHESAPEAKE AND OHIO

ECK ISLAND

14

N

47D2 (Joins sheet 10)

2 150 000 FEET

1 Mile

5 000 Feet

0

0

Scale 1:15 840

1/4

1 000

1/2

2 000

3/4

3 000

1

4 000

5 000

5 000 FEET

(Joins sheet 13)

(Joins sheet 19)

2 135 000 FEET

1 520 000 FEET

(Joins sheet 15)

27C2

Turkey Run

Creek

Little Lickinghole Creek

Whites Branch

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners (+) shown are approximately plotted.

GOOCHLAND COUNTY, VIRGINIA NO. 14

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 15

GOOCHLAND COUNTY, VIRGINIA NO. 15

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

2 155 000 FEET

520 000 FEET

(Joins sheet 14)

(Joins sheet 11)

(Joins sheet 16)

(Joins sheet 20)

510 000 FEET

2 170 000 FEET

Buckinghole Creek

Big Branch

Little Creek

15

N

1 Mile

5 000 Feet

Scale 1:15 840

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 16

16

N

(Joins inset, sheet 8)

2 190 000 FEET

520 000 FEET

LOUISA COUNTY

(Joins sheet 15)

(Joins sheet 17)

510 000 FEET

(Joins sheet 21)

2 175 000 FEET

1 Mile

5 000 Feet

Scale 1:15 840

1 0 1 0 5 000 4 000 3 000 2 000 1 000

This map is compiled on 1975 aerial photography by the U S Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and division corners, if shown, are approximately positioned

GOOCHLAND COUNTY, VIRGINIA NO. 16

GOOCHLAND COUNTY, VIRGINIA NO. 17

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

2 195 000 FEET

520 000 FEET

2 155 000 FEET

554 000 FEET

550 000 FEET

LOUISA COUNTY

(Joins sheet 4)

(Joins sheet 16)

(Joins sheet 7)

(Joins sheet 22)

2 160 000 FEET

2 210 000 FEET

510 000 FEET

Perkinsville

HANOVER CO

17

N

1 Mile

5 000 Feet

Scale 1:15 840

GOOCHLAND COUNTY, VIRGINIA -- SHEET NUMBER 18

18

N

(Joins sheet 13)

(Joins inset, sheet 12)

ELK ISLAND

JAMES

CHESAPEAKE AND OHIO

COUNTY RIVER

Elk Hill

(Joins sheet 19)

(Joins sheet 25)

2 130 000 FEET

2 115 000 FEET

500 000 FEET

505 000 FEET

1 Mile

5 000 Feet

Scale 1:15 840

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA NO. 18

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

2 135 000 FEET

35 D2

(Joins sheet 14)

9C2

1505 000 FEET

45D3

45C3

45C3

(Joins sheet 18)

(Joins sheet 20)

500 000 FEET

(Joins sheet 26)

2 150 000 FEET

Little Lamb Creek

19

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 2

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

GOOCHLAND COUNTY, VIRGINIA NO. 2

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 20

20

N

1 Mile

5 000 Feet

Scale 1:15 840

(Joins sheet 15)

(Joins sheet 19)

(Joins sheet 21)

(Joins sheet 27)

2 170 000 FEET

2 155 000 FEET

800 000 FEET

505 000 FEET

Bogtown

Irwin

Little Creek

Big Creek

Tuckahoe Creek

CHESAPEAKE AND OHIO JAMES RIVER

This map is compiled on 1975 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA NO. 20

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 21

GOOCHLAND COUNTY, VIRGINIA NO. 21

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

2 175 000 FEET

505 000 FEET

(Joins sheet 20)

(Joins sheet 16)

(Joins sheet 22)

(Joins sheet 28)

2 190 000 FEET

1 500 000 FEET

Courthouse Creek

21

N

1 Mile

5 000 Feet

Scale 1:15 840

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA NO. 22

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 23

GOOCHLAND COUNTY, VIRGINIA NO. 23

This map was compiled on 1975 aerial photography by the U. S. Department of Agriculture. Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

2 210 000 FEET

505 000 FEET

(Joins sheet 22)

HANOVER COUNTY

Creek

Shop

Johnson Spring

500 000 FEET

2 225 000 FEET

(Joins sheet 24)

(Joins sheet 30)

23

N

1 Mile

5 000 Feet

Scale 1:15 840

1 5 000 0 0

¼ 1 000

½ 2 000

¾ 4 000

3 000

24

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

(Joins inset A,) 2 251 000 FEET

495 000 FEET

HANOVER COUNTY

HENRICO COUNTY

(Joins sheet 31)

490 000 FEET

2 250 000 FEET

1000 AND 5000-FOOT GRID TICKS

INSET B

2 245 000 FEET

505 000 FEET

(Joins inset A, upper right)

(Joins inset B,) 2 250 000 FEET

1000 AND 4000-FOOT GRID TICKS

INSET A

500 000 FEET

496 000 FEET

(Joins lower right)

HANOVER COUNTY

HENRICO COUNTY

water

2 230 000 FEET

17B2 (Joins sheet 31)

(Joins sheet 23)

This map is compiled on 1971 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

GOOCHLAND COUNTY, VIRGINIA NO. 24

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 25

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

GOOCHLAND COUNTY, VIRGINIA NO. 25

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture. Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 26

26

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

(Joins sheet 19)

(Joins sheet 25)

(Joins sheet 33)

(Joins sheet 27)

2 150 000 FEET

2 135 000 FEET

495 000 FEET

485 000 FEET

Three Square

Three Square Creek

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA NO. 26

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 27

GOOCHLAND COUNTY, VIRGINIA NO. 27

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture. Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

2 155 000 FEET

495 000 FEET

(Joins sheet 20)

(Joins sheet 28)

(Joins sheet 26)

(Joins inset, sheet 32)

485 000 FEET

2 170 000 FEET

James River

Ohio

Lickinshole Creek

Three Square Creek

Chesapeake and Ohio Railroad

County

Powhatan

water

27

N

1 Mile

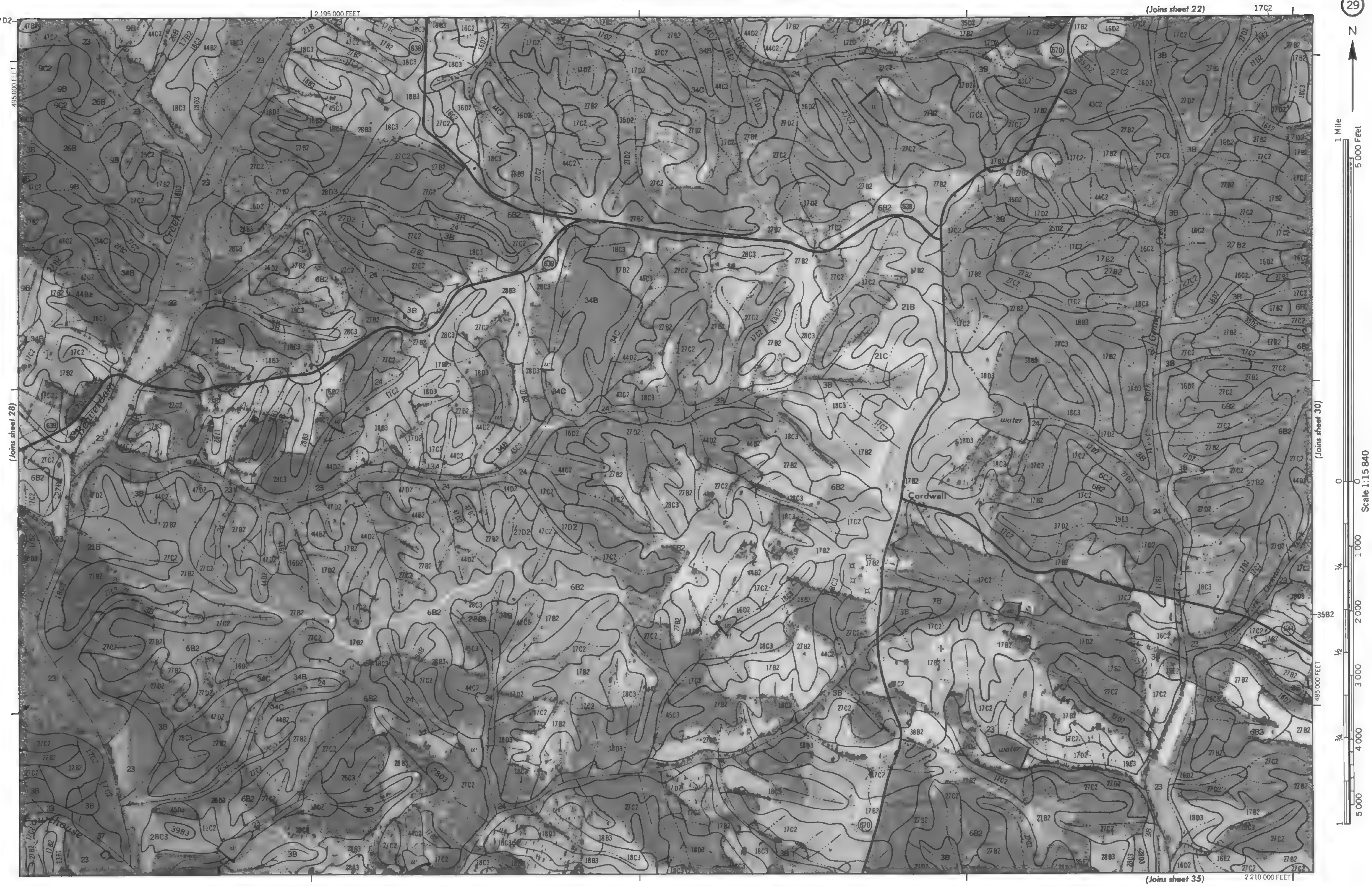
5 000 Feet

Scale 1:15 840

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 28

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

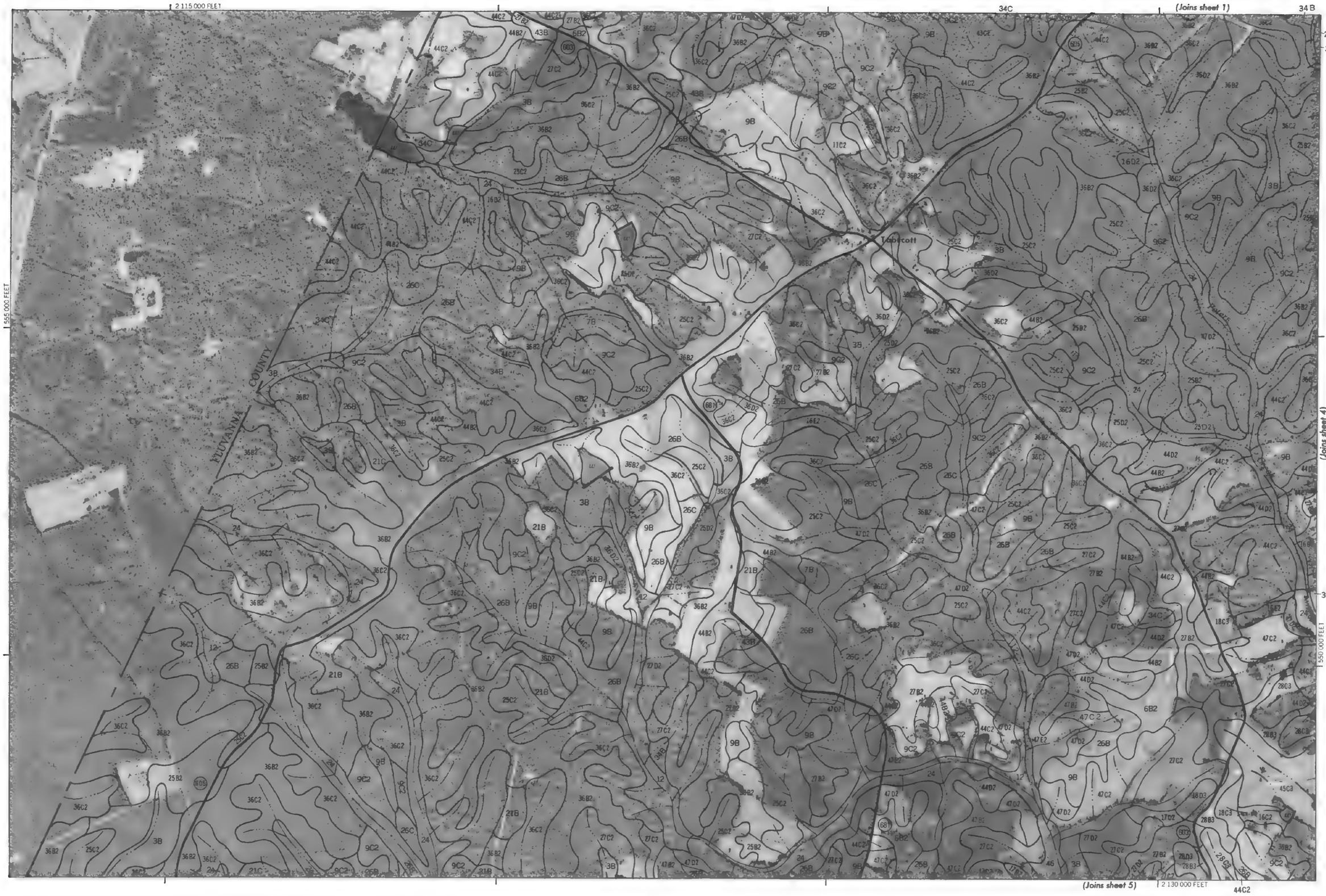
GOOCHLAND COUNTY, VIRGINIA NO. 28



GOOCHLAND COUNTY, VIRGINIA NO. 29

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 3



3

N

1 Mile

5 000 Feet

Scale 1:15 840

GOOCHLAND COUNTY, VIRGINIA NO. 3

This map is compiled on 1975 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 30

30

N

(Joins sheet 23)

2 225 000 FEET

4 95 000 FEET

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

(Joins sheet 29)

4 85 000 FEET

(Joins sheet 31)

(Joins sheet 36)

2 215 000 FEET

This map was compiled on 1975 aerial photography by the U. S. Department of Agriculture Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

GOOCHLAND COUNTY, VIRGINIA NO. 30

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 31

GOOCHLAND COUNTY, VIRGINIA NO. 31

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

2 230 000 FEET

495 000 FEET

(Joins sheet 30)

(Joins sheet 24)

(Joins inset sheet 24)

(Joins sheet 37)

485 000 FEET

2 245 000 FEET

Centerville

Hickory Haven

Tuckahoe Creek

HENRICO COUNTY

31

N

1 Mile

5 000 Feet

Scale 1:15 840

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 32

32

N

1 Mile

5 000 Feet

Scale 1:15 840

(Joins sheet 33)

(Joins sheet 27)

(Joins sheet 25)

(Joins sheet 33)

480 000 FEET

470 000 FEET

2 155 000 FEET

2 160 000 FEET

2 130 000 FEET

2 125 000 FEET

CHESAPEAKE AND OHIO

JAMES RIVER

POWHATAN COUNTY

Bolling Island

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA NO. 32

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 33

GOOCHLAND COUNTY, VIRGINIA NO. 33

This map is compiled on 1970 aerial photography by the U S Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

2 135 000 FEET

480 000 FEET

(Joins sheet 32)

(Joins sheet 26)

(Joins inset, sheet 32)

470 000 FEET

2 150 000 FEET

JAMES RIVER

POWHATAN COUNTY

CHESAPEAKE AND OHIO

West View

Rock Castle

water

N

1 Mile

5 000 Feet

Scale 1:15840

34

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

2 110 000 FEET

545 000 FEET

535 000 FEET

2 106 000 FEET

(Joins sheet 8)

(Joins sheet 5)

4000 AND 5000-FOOT GRID TICKS

INSET A

3502 18D3 (Joins sheet 28) 27D2 2 190 000 FEET

480 000 FEET

470 000 FEET

(Joins sheet 35)

JAMES RIVER

POWHATAN COUNTY

CHESAPEAKE AND OHIO

2 250 000 FEET

464 000 FEET

HENRICO COUNTY

Tuckahoe Creek

(Joins sheet 40)

12 (Joins inset, sheet 41) 8C 2 255 000 FEET

4000 AND 5000-FOOT GRID TICKS

INSET B

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

GOOCHLAND COUNTY, VIRGINIA NO. 34

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 35

GOOCHLAND COUNTY, VIRGINIA NO. 35

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

2 195 000 FEET

1 480 000 FEET

(Joins sheet 29)

(Joins sheet 34)

(Joins sheet 36)

(Joins sheet 38)

2 210 000 FEET

470 000 FEET

Beaverdam

Thorncliff

State Farm

Creek

CHESAPEAKE AND OHIO

JAMES

POWHATAN

RIVER

COUNTY

water

Crozier

Creek

35

N

1 Mile

5 000 Feet

Scale 1:15 840

0 0

¼ 1 000

½ 2 000

¾ 3 000

1 4 000

1¼ 5 000

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 36

36

N

1 Mile

5 000 Feet

Scale 1:15 840

1 0 1 000 2 000 3 000 4 000 5 000

¼ ½ ¾

2 225 000 FEET

1 480 000 FEET

1 470 000 FEET

2 210 000 FEET

(Joins sheet 30)

(Joins sheet 35)

(Joins sheet 37)

(Joins sheet 39)

Creek

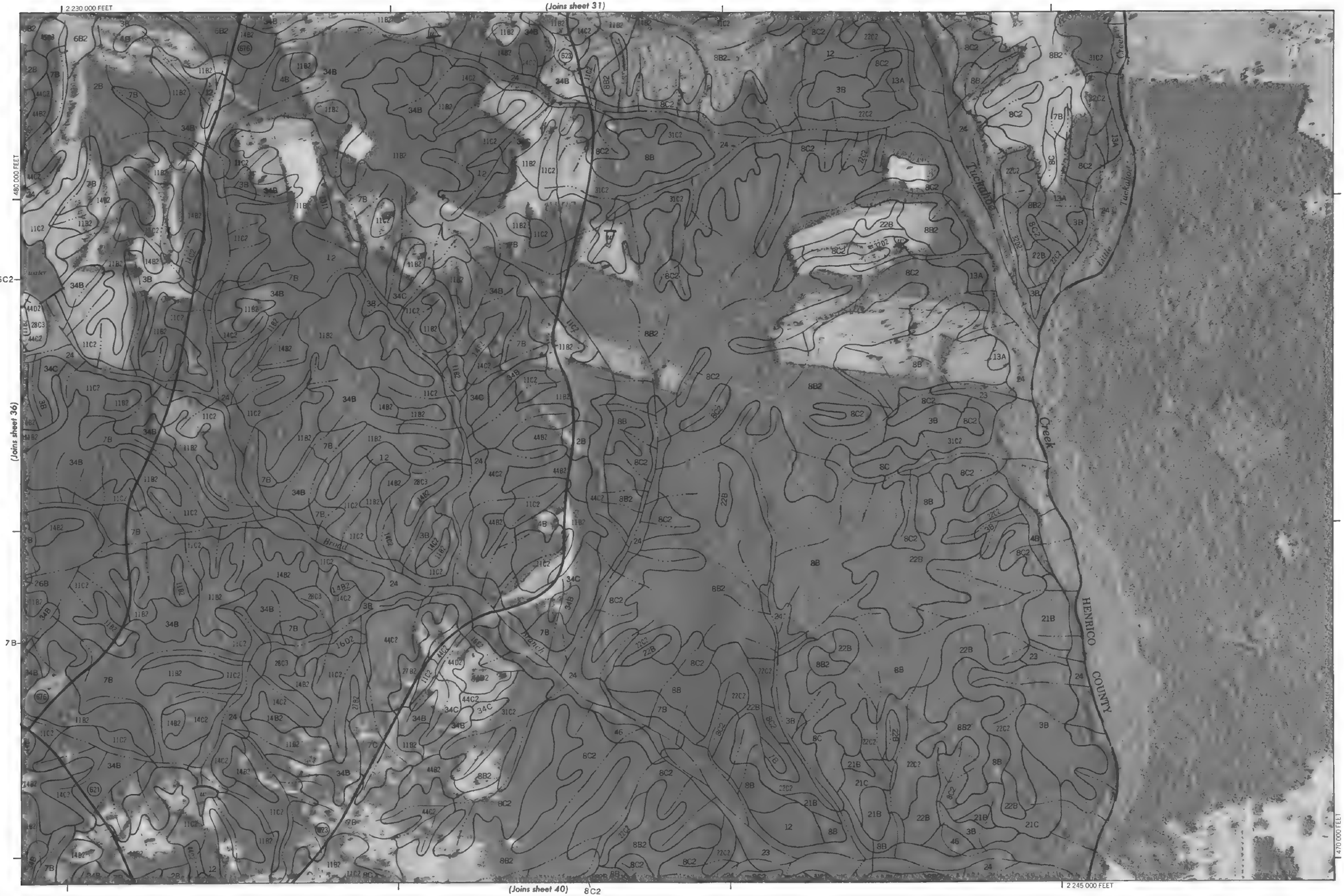
Dover

water

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

GOOCHLAND COUNTY, VIRGINIA NO. 36

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 37



GOOCHLAND COUNTY, VIRGINIA NO. 37

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 38

38

N

1 Mile

5 000 Feet

0 0

Scale 1:15 840

1 5 000 | ¾ 4 000 | ½ 3 000 | ¼ 2 000 | 0 1 000

(Joins sheet 35)

(Joins sheet 39)

2 210 000 FEET

465 000 FEET

460 000 FEET

2 195 000 FEET

JAMES RIVER

CHESAPEAKE AND OHIO

POWHATAN COUNTY

This map is compiled on 1975 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA NO. 38

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 39

GOOCHLAND COUNTY, VIRGINIA NO. 39

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 38)

(Joins sheet 36)

(Joins sheet 40)

2 225 000 FEET

2 215 000 FEET

460 000 FEET

465 000 FEET

James River

Powhatan County

Sabot Creek

Chesapeake and Ohio Railroad

Sabot Island

Boscobel

Manakin Farms

N

1 Mile

5 000 Feet

Scale 1:15 840

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 4

4

N

1 Mile

5 000 Feet

Scale 1:15 840

(Joins sheet 2)

(Joins sheet 3)

(Joins sheet 6)

(Joins inset, sheet 17)

2 150 000 FEET

2 135 000 FEET

555 000 FEET

550 000 FEET

LOUISA COUNTY

Mill Creek

Creek

This map is compiled on 1975 aer al photography by the U. S Department of Agriculture. Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land div sion corners, if shown, are approximately positioned

GOOCHLAND COUNTY, VIRGINIA NO. 4

40

N

1 Mile

5 000 Feet

Scale 1:15 840

1 0 1 0 5 000 ¾ 4 000 ½ 3 000 ¼ 2 000 0 1 000

2 230 000 FEET

(Joins sheet 37)

465 000 FEET

(Joins sheet 39)

Manakin

HENRICO COUNTY

Tuckahoe Creek

CHESAPEAKE AND OHIO

JAMES RIVER

POWHATAN COUNTY

(Joins sheet 41)

(Joins inset B, sheet 34)

460 000 FEET

2 245 000 FEET

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Universal transverse Mercator grid values, zone 18, shown in blue
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA NO. 40

GOOCHLAND COUNTY, VIRGINIA NO. 41

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

41

N

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 5

GOOCHLAND COUNTY, VIRGINIA NO. 5

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

2 115 000 FEET

545 000 FEET

(Joins inset A, sheet 34)

(Joins sheet 3)

115C3

535 000 FEET

(Joins sheet 6)

(Joins sheet 9)

2 130 000 FEET

36 C2

5

N

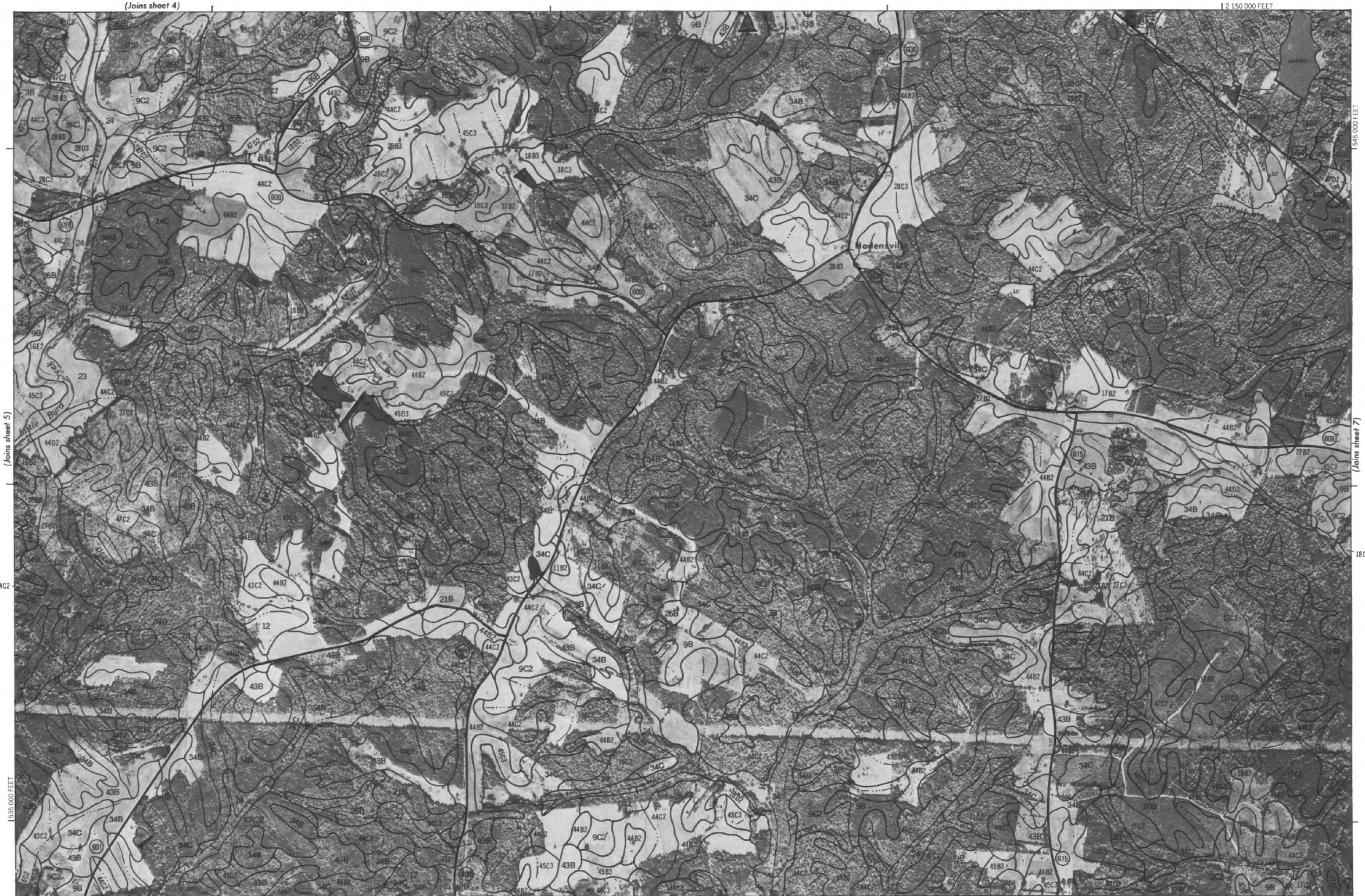
1 Mile

5 000 Feet

Scale 1:15 840

0 0 1/4 1 000 1/2 2 000 3/4 3 000 1 4 000 5 000

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 6



This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA NO. 6

GOOCHLAND COUNTY, VIRGINIA — SHEET NUMBER 7

GOOCHLAND COUNTY, VIRGINIA NO. 7

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

34C | 2 155 000 FEET | 44B2 (Joins inset, sheet 17) | 44C2 | 34C | 44B2

16D2 | 545 000 FEET

(Joins sheet 6)

44C2 | 16D2 | 17B2 | 44B2

9B | 27B2 | (Joins sheet 11) | 27B2

535 000 FEET | 2 170 000 FEET

Harris Pond | Big | Dickinson | Creek | East Lake | LOUISA COUNTY

7

N

1 Mile | 5 000 Feet

Scale 1:15 840

1 | 5 000 | ¾ | 4 000 | ½ | 3 000 | ¼ | 2 000 | 0 | 1 000 | 0

8

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

2 175 000 FEET

530 000 FEET

525 000 FEET

2 172 000 FEET

(Joins sheet 11)

(Joins inset, sheet 34)

2 110 000 FEET

530 000 FEET

(Joins sheet 9)

525 000 FEET

2 095 000 FEET

(Joins sheet 12)

(Joins sheet 16)

3000 AND 5000-FOOT GRID TICKS

LOUISA COUNTY

FLUVANNA COUNTY

Byrd

17C2

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GOOCHLAND COUNTY, VIRGINIA NO. 8

GOOCHLAND COUNTY, VIRGINIA NO. 9

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

2 115 000 FEET

530 000 FEET

525 000 FEET

2 130 000 FEET (Joins sheet 13)

(Joins sheet 8)

(Joins sheet 5)

(Joins sheet 10)

44B2

Creek

Burck

Bula

9

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

1 000 2 000 3 000 4 000 5 000